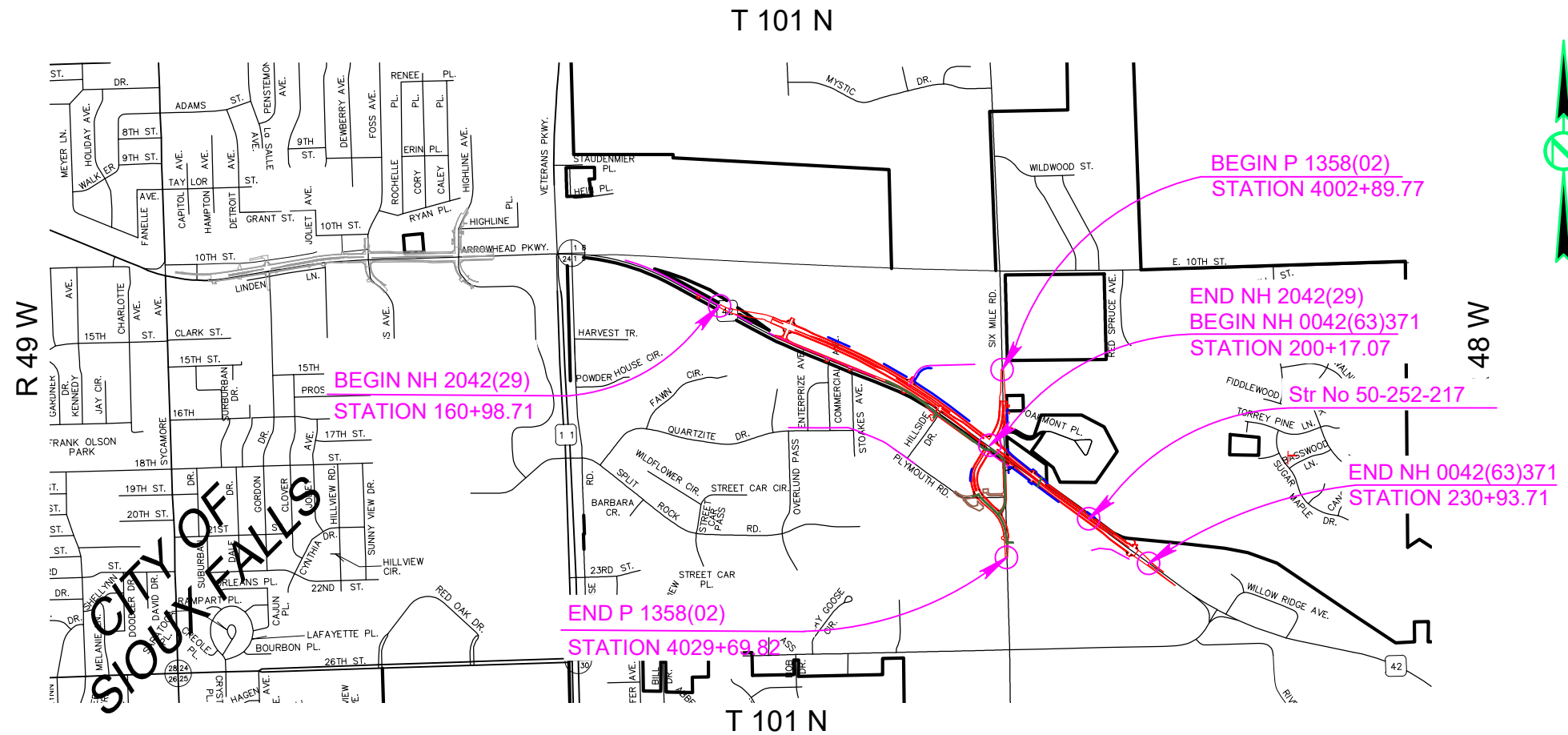


Section L: Lighting & Signal Plans

INDEX OF SECTIONS

- L1 General Layout W/Index
- L2-L13 Estimate with General Notes & Tables
- L14 Overall Layout
- L15-L17 Existing & Proposed Signal Layouts
- L18-L37 Conduit Layouts - Arrowhead Parkway
- L38-L42 Conduit Layouts - Six Mile Road
- L43-L44 Video Detection Layouts
- L45-L50 Wiring Diagrams
- L51-L60 Standard Plates



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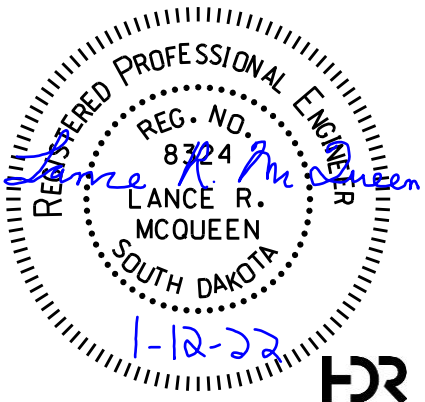
Plotting Date: 1/7/2022 REV DATE: 1/12/2022 INITIAL: LRM

SECTION L ESTIMATE OF QUANTITIES

LIGHTING						
BID ITEM NUMBER	ITEM	Quantity				UNIT
		PCN 06YQ west Arrowhead	PCN 05C6 east Arrowhead	PCN 05C2 Six Mile Road	Total	
635E0040	Breakaway Base Luminaire Pole with Arm, 40' Mounting Height	-	-	5	5	Each
635E0140	Breakaway Base Luminaire Pole with Twin Arms, 40' Mounting Height	-	-	7	7	Each
635E0150	Breakaway Base Luminaire Pole with Twin Arms, 50' Mounting Height	13	9	-	22	Each
635E3700	Roadway Luminaire, LED with Photoelectric Cell	26	18	19	63	Each
635E5020	2' Diameter Footing	120.0	81.0	96.0	297.0	Ft
635E5310	Special Electrical Junction Box	6	7	11	24	Each
635E5400	Electrical Service Cabinet	1	1	2	4	Each
635E6200	Miscellaneous, Electrical	Lump Sum	Lump Sum	Lump Sum	Lump Sum	LS
635E7899	Locator Ball	1	-	1	2	Each
635E8120	2" Rigid Conduit, Schedule 40	2,920	2,135	2,175	7,230	Ft
635E8220	2" Rigid Conduit, Schedule 80	790	750	1,275	2,815	Ft
635E8830	2/2/2/4 Aluminum Wire	3,345	2,435	2,655	8,435	Ft
635E8900	3/C #0000 AWG Aluminum Wire	350	320	110	780	Ft
635E9014	1/C #4 AWG Copper Wire	280	120	700	1,100	Ft
635E9024	1/C #14 AWG Copper Wire	155	295	765	1,215	Ft
635E9710	2/C #10 AWG Copper Pole and Bracket Cable	1,690	1,170	1,045	3,905	Ft

TRAFFIC SIGNALS						
BID ITEM NUMBER	ITEM	Quantity				UNIT
		PCN 06YQ west Arrowhead	PCN 05C6 east Arrowhead	PCN 05C2 Six Mile Road	Total	
110E5110	Salvage Signal Equipment	-	-	Lump Sum	Lump Sum	LS
635E2045	Signal Pole with 45' Mast Arm	1	-	-	1	Each
635E2050	Signal Pole with 50' Mast Arm	1	-	-	1	Each
635E2055	Signal Pole with 55' Mast Arm	-	-	1	1	Each
635E2065	Signal Pole with 65' Mast Arm	1	-	1	2	Each
635E2070	Signal Pole with 70' Mast Arm	1	-	2	3	Each
635E4030	3 Section Vehicle Signal Head	8	-	12	20	Each
635E4040	4 Section Vehicle Signal Head	8	-	9	17	Each
635E4050	5 Section Vehicle Signal Head	2	-	-	2	Each
635E5030	3' Diameter Footing	60.0	-	60.0	120.0	Ft
635E5310	Special Electrical Junction Box	23	18	17	58	Each
635E5430	Traffic Signal Controller	1	-	1	2	Each
635E5450	Side Mounted Cabinet	2	-	2	4	Each
635E5515	Battery Backup System for Traffic Signal	1	-	1	2	Each
635E5520	Video Detection System	1	-	1	2	Each
635E5560	Emergency Vehicle Preemption Unit	1	-	1	2	Each
635E5570	Optical Detector	4	-	4	8	Each
635E5600	Surveillance Camera	1	-	1	2	Each
635E5880	Accessible Pedestrian Signal	8	-	8	16	Each
635E5910	Pedestrian Push Button Pole	8	-	8	16	Each
635E5922	Pedestrian Signal Head with Countdown Timer	8	-	8	16	Each
635E5930	Pedestrian Crossing Sign	8	-	8	16	Each
635E7017	* Furnish Signal Pole with Mast Arm and Luminaire Arm	-	1	-	1	Each
635E8110	1" Rigid Conduit, Schedule 40	120	120	180	420	Ft
635E8120	2" Rigid Conduit, Schedule 40	80	65	120	265	Ft
635E8140	4" Rigid Conduit, Schedule 40	100	-	60	160	Ft
635E8220	2" Rigid Conduit, Schedule 80	100	-	95	195	Ft
635E8230	3" Rigid Conduit, Schedule 80	350	350	490	1,190	Ft
635E8415	1" Innerduct, SDR 13.5	14,310	5,420	5,240	24,970	Ft
635E8420	1.5" Innerduct, SDR 13.5	50	-	50	100	Ft
635E9016	1/C #6 AWG Copper Wire	150	-	150	300	Ft
635E9022	1/C #12 AWG Copper Wire	8,700	6,125	6,400	21,225	Ft
635E9302	2/C #14 AWG IMSA Copper Cable, K1	280	-	340	620	Ft
635E9303	3/C #14 AWG IMSA Copper Cable, K1	120	-	120	240	Ft
635E9305	5/C #14 AWG IMSA Copper Cable, K1	445	-	630	1,075	Ft
635E9307	7/C #14 AWG IMSA Copper Cable, K1	415	-	495	910	Ft
635E9325	25/C #14 AWG IMSA Copper Cable, K1	900	-	1,000	1,900	Ft
635E9800	Preemption Cable	2,340	-	2,570	4,910	Ft
635E9924	24 Strand Fiber Optic Cable	8,350	-	400	8,750	Ft

* - Denotes Non-Participating



SUPPLYING AS BUILT PLANS

If the traffic signal systems or roadway lighting systems are constructed differently than what is stated in the plans, the Contractor will supply as built plans to the Engineer and a copy will be sent to the Traffic Design Engineer. The as built plans may include conduit layouts, wiring diagrams, or other drawings depicting the changes from the original plans.

SHOP DRAWING AND CATALOG CUTS SUBMITTAL

The Contractor will submit shop drawings and catalog cuts in accordance with Section 985 of the Specifications.

Adobe PDF submittals will be sent to the following email addresses:

Lance.McQueen@hdrinc.com

Upon review of the submittals, they will be sent by the Engineer to the following email addresses for concurrence of approvals or remarks:

John.Less@state.sd.us

Kelly.Vandeweile@state.sd.us

HHoftiezer@siouxfalls.org

ON-SITE INSPECTION

An on-site inspection of the traffic signals will be conducted before acceptance of the project, once the traffic signals are completed and operational. The on-site inspection will be conducted by the Contractor, Region Traffic Engineer, City Traffic Engineer and Consultant Design Engineer and City Light Department.

SPECIAL PROVISIONS

The following special provisions are attached to the project specifications and will be reviewed by the Contractor for furnishing and installing the proposed traffic equipment.

- Special Provision for Optical Activated Emergency Vehicle Preemption System
- Special Provision for ATC Traffic Signal Controller Cabinet
- Special Provision for Traffic Signal Heads (LED Modules)

MISCELLANEOUS, ELECTRICAL

The contract lump sum price for "Miscellaneous, Electrical" will include all costs for the following work items:

NH 2042(29) - PCN 06YQ

- Connecting / tying to existing conduits and junction boxes
- Removal of existing traffic and lighting junction boxes
- Removal / abandonment of existing lighting and traffic conduits and cables

NH 0042(63)371- PCN05C6

- Connecting / tying to existing conduits and junction boxes
- Removal of existing traffic and lighting junction boxes
- Removal / abandonment of existing lighting and traffic conduits and cables
- Removal / abandonment of existing detector loops
- Installation of the future pedestrian push button posts FPB1 thru FPB8 at the Willow Run Entrance & Arrowhead Pkwy intersection

P 1358(02) - PCN 05C2

- Connecting / tying to existing conduits and junction boxes
- Installing caps on ends of proposed conduits
- Removal of existing traffic and lighting junction boxes
- Removal / abandonment of existing lighting and traffic conduits and cables
- Removal of existing service cabinets and meters

SALVAGE SIGNAL EQUIPMENT

Existing traffic signal equipment will be salvaged and delivered to the City of Sioux Falls Traffic Shop, at the address shown below. Contact Heath Hoftiezer (#605-367-8634) for delivery information. The Contractor will contact the City 5 days before delivery.

City Traffic Shop
1100 E. Chambers Street
Sioux Falls, SD 57104

Signal equipment damaged during this work will be repaired or replaced by the Contractor at no cost to the State.

All costs for work involved in the salvage and delivery of the existing signal equipment will be incidental to the contract lump sum price for "Salvage Signal Equipment".

REMOVE JUNCTION BOX (TRAFFIC OR LIGHTING)

The Contractor will remove all junction boxes as designated in the plans. All rings and covers will be returned to the applicable department. If the junction box is labeled "Electric", deliver to City Light Shop. If the junction box is labeled "Traffic", deliver to City Traffic Shop.

Contact the City Light Shop (#605-373-6979) and City Traffic Shop (#605-367-8634) for delivery information. The Contractor will contact the City 5 days before delivery.

All costs for removal and delivery of the junction boxes will be included in the contract lump sum price for "Miscellaneous, Electrical".

TABLE OF FOOTING DATA

Site Designation	Footing Diameter	*Footing Depth	**Spiral Diameter	**Spiral Length	Vertical Reinforcement
L1-L3	2' - 0"	10' - 0"	See Standard Plate #635.60		
L4-L19 L46-L48	2' - 0"	9' - 0"			
SXL4-SXL15	2' - 0"	8' - 0"			
S30	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"
S31	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"
S32	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"
S33	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"
S1	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"
S2	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"
S3	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"
S4	3' - 0"	15' - 0"	2' - 8"	145' - 9"	14-#8 x 14' -6"

*Footing depth will be below ground level.

**The size of all spirals will be #3.

FOR BIDDING PURPOSES ONLY

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Plotting Date: 1/4/2022

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SOILS INFORMATION

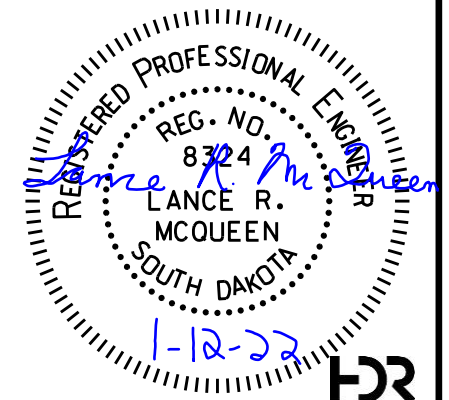
Subsurface soils in the vicinity of the project area have a loamy consistency with classifications ranging from silt clay to clay silt to sand.

Station	Offset	Depth (ft)	Classification	Depth to Water	Date
Arrowhead Parkway					
179+00	50'Rt.	0-4.5	Clay Sand	Dry	January 2019
		4.5-12.0	Clay Silt		
200+10	70' Rt.	0-6.0	Silt Clay	Dry	December 2019
		6.0-20.0	Clay Silt		
205+00	4'Rt.	0-8.0	Silt Clay	Dry	January 2019
212+00	15'Lt.	0-8.0	Silt Clay	Dry	January 2019
222+00	24'Lt.	0-8.0	Sandy Clay	Dry	January 2019
223+30	49'Lt.	0-3.0	Clay Silt	Dry	December 2019
		3.0-15.0	Silt Clay		
224+00	57'Rt.	0-2.5	Clay	4.8'	December 2019
		2.5-5.0	Sand		
		5.0-7.5	Clay Sand		
		7.5-15.0	Sandy Clay		
Six Mile Road					
4016+00	0	0-18.0	Clay Silt	Dry	January 2019

Construction activities will be sequenced in a manner such that utility excavations within 10 feet of any proposed footing will be completed and backfilled prior to excavation of cylindrical footings. Backfill of excavations within 10 feet of proposed footings will be with cohesive material approved by the Engineer placed in loose lifts not to exceed 6 inches and compacted according to the Specified Density Method.

Groundwater may be encountered during construction of the cylindrical footings. The longer the excavations are left open the more likely caving may occur.

Concrete will not be dropped through standing water. If water is present in the excavation it must be removed prior to concrete placement or the concrete will be tremied.



ROADWAY LIGHTING

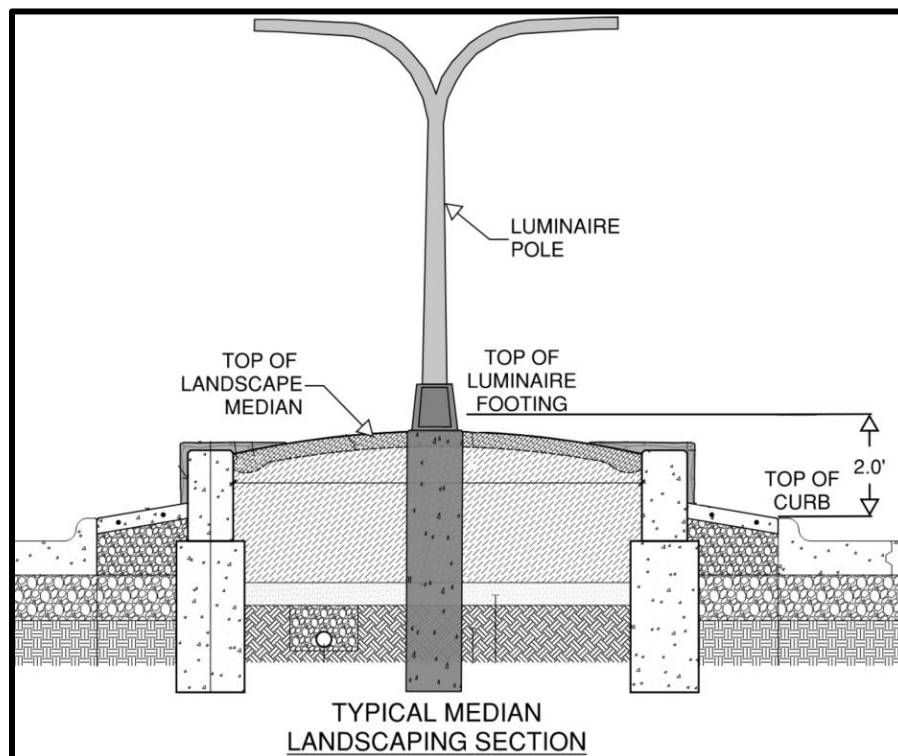
The roadway lighting items will be installed as discussed in the plans and the Standard Specifications for Roadway Lighting – Section 635B. The following notes are provided for the Contractor's clarification.

- The Standard Specifications can be viewed online at: <http://www.siouxfalls.org/public-works/engineering/construction-mgmt/resources/specs-policies-manuals>.
- The Contractor will refer to Section A of 635B.3 of the Construction Requirements in the Standard Specifications for the coordination and application process to follow for the electrical services.
- The Contractor will complete both the Roadway Lighting and Traffic Signal Checklists for installation of all items shown on the plans. The checklists can be found at the following website: <http://www.siouxfalls.org/public-works/engineering/construction-mgmt/resources/forms-permits>.
- The proposed luminaire poles will have breakaway transformer bases and will be installed on concrete footings.
- The Contractor will furnish and install all street light wire and will pull all wires through the conduits, junction boxes, and luminaire poles.
- The Contractor will make all line-to-line connections and will furnish and install all items listed under Section 635B.G (Connectors) in the Standard Specifications for fuses, fuse-holder kits, in-line fuse holders, splice kits, stub connection kits and multi-cable connectors to be furnished and installed within the junction boxes, light pole bases and meter locations. This will supersede the requirements stated in the Standard Specifications.
- The City Light department will de-energize the lights to be removed.
- #14 AWG Tracer wire will be installed in lighting conduit not carrying wire. The tracer wire will be paid for separately under its respective bid item, unless noted otherwise.

LIGHT POLES IN MEDIAN LANDSCAPING SECTION

Proposed light poles L1, L2, L3 are to be installed within the median landscaping section. These light poles will have a top of footing elevation that is 2' above the top of adjacent curb. This 2' rise is due to the median landscaping section rising above the top of the median curb.

A diagram is shown below of the typical median section being installed. See Section H (landscaping) for further landscaping information.



ARROWHEAD PKWY LUMINAIRES

The accepted lighting design for Arrowhead Pkwy used the following parameters and provides 1.1 and greater average maintained foot-candles and uniformity ratios of 3:1 (average maintained to minimum maintained foot-candles) and 5:1 (maximum to minimum maintained foot candles):

L1-L19, L46-L48

Setback:	2-11.5 Ft.
Lamp Loss Factor (LLF):	0.8
Width of Lighted Area:	85 Ft.
Spacing:	254 Ft.
Configuration:	Center of Median
Mounting Height:	50 Ft.
Arm Extension Length:	Twin 8 Ft.
Luminaire:	Type 2 - 159W LED

SIX MILE ROAD LUMINAIRES

The accepted lighting design for Six Mile Road used the following parameters and provides 0.9 and greater average maintained foot-candles and uniformity ratios of 4:1 (average maintained to minimum maintained foot-candles) and 5:1 (maximum to minimum maintained foot candles):

SXL4-SXL10

Setback:	2-7.5 Ft.
Lamp Loss Factor (LLF):	0.8
Width of Lighted Area:	55 Ft.
Spacing:	180 Ft.
Configuration:	Center of Median
Mounting Height:	40 Ft.
Arm Extension Length:	Twin 8 Ft.
Luminaire:	Type 2 - 105W LED

SXL11-SXL15

Setback:	3.5 Ft.
Lamp Loss Factor (LLF):	0.8
Width of Lighted Area:	55 Ft.
Spacing:	145 Ft.
Configuration:	One Sided
Mounting Height:	40 Ft.
Arm Extension Length:	8 Ft.
Luminaire:	Type 3 - 105W LED

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LUMINAIRES

For the luminaires discussed previously on this sheet, the following luminaires meet the requirements for this design:

- Type 2 - 159W LED
 - Autobahn AT02-P453-MVOLT-R2-P7-PCLL or approved equal
 - Voltage will be universal 120-277V
 - Distribution will be Type 2
 - Absolute Lumens will be 23,900
 - Will have a BUG rating of B3-U0-G3
 - CCT will be 4000K
 - Color will be gray
 - 20kV/10kA SPD Surge Protection will be provided
 - A Terminal Block will be provided
 - A 7 pin photocontrol receptacle will be provided
 - A Long Life Photocontrol receptacle will be provided
 - Bird guards will be provided on the mounting hole of the LED fixture
- Type 2 - 105W LED
 - Autobahn ATB0-P451-MVOLT-R2-P7-PCLL or approved equal
 - Voltage will be universal 120-277V
 - Distribution will be Type 2
 - Absolute Lumens will be 16,570
 - Will have a BUG rating of B3-U0-G3
 - CCT will be 4000K
 - Color will be gray
 - 20kV/10kA SPD Surge Protection will be provided
 - A Terminal Block will be provided
 - A 7 pin photocontrol receptacle will be provided
 - A Long Life Photocontrol receptacle will be provided
 - Bird guards will be provided on the mounting hole of the LED fixture
- Type 3 - 105W LED
 - Autobahn ATB0-P451-MVOLT-R3-P7-PCLL or approved equal
 - Voltage will be universal 120-277V
 - Distribution will be Type 3
 - Absolute Lumens will be 16,640
 - Will have a BUG rating of B2-U0-G3
 - CCT will be 4000K
 - Color will be gray
 - 20kV/10kA SPD Surge Protection will be provided
 - A Terminal Block will be provided
 - A 7 pin photocontrol receptacle will be provided
 - A Long Life Photocontrol receptacle will be provided
 - Bird guards will be provided on the mounting hole of the LED fixture

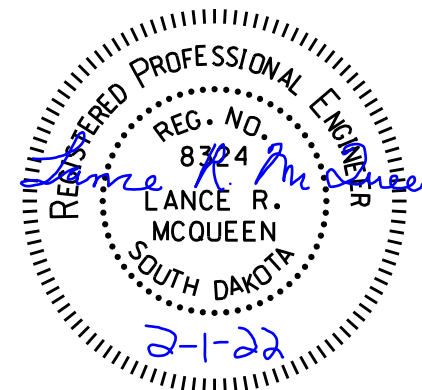
SIGNAL POLES

Signal poles will be per SDDOT Specifications.

Cantilever traffic signal supports, including anchor bolts, will be designed for fatigue in accordance with Fatigue Importance Category III without galloping and truck induced gusts.

All poles will have transformer bases.

Signal poles will have rotatable mast arms.



FURNISH SIGNAL POLE

A signal pole with 70' mast arm length and 50' luminaire extension (50' height from luminaire to ground) will be furnished with the project. The luminaire arm / extension will be 8' in length.

- A transformer base, anchor bolts, mounting hardware, etc. will be furnished with this signal pole.
- All items will meet the specifications discussed above under the heading SIGNAL POLES.

All items will be delivered to the City Traffic Department.

- Contact Heath Hoftiezer (#605-367-8634) for delivery information.
- The Contractor will contact the City 5 days before delivery.
- The mast arm and transformer base will not be attached to the signal pole upon delivery.

All costs for this will be included in the contract unit price per each "Furnish Signal Pole with Mast Arm and Luminaire Arm".

SPECIAL ELECTRICAL JUNCTION BOX

The proposed electrical junction boxes for traffic, innerduct and lighting will be the 18", 24" or 30" diameter junction boxes as shown on City of Sioux Falls standard plates #635.31, 635.33 and 635.70.

All costs for the junction boxes, regardless of type or size, will be included in the contract unit price per each "Special Electrical Junction Box".

MULTICONDUCTOR CONTROL CABLE FOR SIGNAL CIRCUITS

The Conductor Jackets for the multiconductor control cables will be color coded in accordance with IMSA 19-1 Table 5.1.

TRAFFIC SIGNAL WIRING

The Contractor will use Buchanan crimp connectors and insulating caps, or approved equal, on all wire terminations in the signal bases.

All costs for this work will be incidental to the signal bid items.

TRAFFIC AND FIBER OPTIC CABLE CONDUIT

All nonmetallic conduit open ends will have an approved bell end or bushing installed to prevent damage to cable or conductors, per the City's specifications Section 635A.3.G.6.

#12 AWG Tracer wire will be installed in all traffic conduit and interconnect. The tracer wire will be paid for separately under its respective bid item, unless noted otherwise.

SIGNAL BACKPLATES

The vehicle signal head backplates will have a factory applied 3-inch wide yellow retroreflective border. Sheeting for the border will be Type XI or Type IX in conformance with ASTM D4956.

Signal backplates will be polycarbonate, aluminum, or aluminum-composite. Minimum material thicknesses are:

- Polycarbonate, 0.10-inch
- Aluminum, 0.06-inch
- Aluminum-Composite, 0.08-inch

Signal backplates will extend not less than 5 inches from the edge of the signal head at the top, bottom, and sides. The bottom of the backplate on vehicle signal faces mounted directly above pedestrian signal indications will be sized to permit the separate adjustment of the vehicle and pedestrian signal indication and may be less than 4 inches.

All costs involved with furnishing and installing backplates with retroreflective border for the new vehicle signal heads will be incidental to the appropriate signal head bid item.

TRAFFIC SIGNAL HEADS

Traffic signal heads for vehicle and pedestrian traffic signal heads will be furnished and installed by the Contractor, as specified in the special provisions. All costs for the traffic signal heads will be included in the appropriate signal head bid item.

In addition to the special provisions for the traffic signal heads, the following specifications will also apply:

- vehicle and pedestrian signals heads colors will be Black body, Black doors, Black tunnel visors and Black backplates
- all hardware associated with mounting the vehicle and pedestrian signals heads will have P33 Gloss Black color
- pedestrian signal heads will be two separate 12"x12" signal heads. The man/hand display head will be mounted above the countdown timer display head as shown to the right.



FISHEYE VIDEO CAMERA DETECTION SYSTEM

The Fisheye Video Camera, Processor Unit, and Cables will be furnished and installed by the Contractor to meet the specifications discussed below.

All costs to furnish and install the complete Fisheye Video Camera Detection System will be included in the contract unit price per each for "Video Detection System". These costs will include, but not be limited to:

- fisheye camera, mounting brackets, and hardware
- processor unit, cabling between processor and controller, Shielded CAT-5e cable, and antenna
- all equipment required in the controller cabinet to provide a fully functioning fisheye video vehicle detection system

The Fisheye Video Camera Detection Systems will also be furnished and installed with the Performance Plus Module or approved equal, to allow the Fisheye Video Camera Detection System to be capable of traffic counting and enhanced pedestrian and cyclist detection, as well as functionality for generating reports for traffic counts, length-based classifications, turning movements, red and green occupancy, and cycle lengths. The Performance Plus Module or approved equal will be incidental to the contract unit price per each for "Video Detection System". The Performance Plus Module or approved equal will be with no subscription fees or any other fees to be paid by the City / Owner for a 10-year time period.

The Shielded CAT-5e cable for the Fisheye Camera will be installed from the controller cabinet to the camera unit without splices. The Contractor will use only shielded cable approved by the camera manufacturer to protect against Electromagnetic Interference (EMI). Cable will be rated for outdoor use and installed according to the manufacturer's recommendations. All costs for the Shielded CAT-5e cable will be incidental to the contract unit price per each for "Video Detection System".

The Contractor will coordinate with the City prior to determining the final video camera mounting location. Contact Troy Miller (#605-367-8624) of the City.



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Plotting Date: 2/1/2022

REV DATE: 2/01/2022 INITIAL: LRM

SURVEILLANCE CAMERA

The traffic surveillance camera will be furnished and installed by the Contractor.

The traffic surveillance camera will be an AXIS Q6155-E PTZ Dome Network Camera 60Hz model as manufactured AXIS Communications or approved equal. The camera will be outdoor-ready. The camera will be pre-equipped from the manufacturer with the following:

- pole mounting kit AXIS T91A67 or approved equal
- a power supply
- an outdoor rated power strip
- a lightning suppression device
- outdoor rated Cat6e cable
- 64 MB SD Card
- all other required cables, connectors and jumpers to make a fully functional surveillance camera system

The Contractor will mount the camera so that the mounting bracket is on the luminaire extension as high as possible before the luminaire extension starts to curve.

All costs to furnish and install the traffic surveillance camera will be included in the contract unit price per each for "Surveillance Camera".

The CAT-5 cable for the traffic surveillance camera will be installed from the controller cabinet to the camera without splices. The cable will be rated for outdoor use and installed according to the manufacturer's recommendations. All costs for the CAT-5 cable will be included in the contract unit price per each for "Surveillance Camera".

OPTICAL ACTIVATED EMERGENCY VEHICLE PRE-EMPTION SYSTEM

Optical Activated Emergency Vehicle Preemption (EVP) Systems will be furnished and installed by the Contractor to meet the specifications discussed below and in the special provisions.

The Contractor will furnish and install the EVP Systems on the mast arms at the intersections as shown on the plans.

The EVP detector heads and confirmation lights will be mounted to the signal mast arm using 3/4-inch NPT electrical pipe materials including a malleable Iron "T" approved for rain-tight locations, threaded nipples, and single lamp holder approved for outdoor use. The use of a PELCO AB-0155-42 Band Mount Mini-Brac, or approved, equal will be used where no integrated threaded outlet exists on the mast arm. All equipment will be securely mounted to be level/plumb and retain its alignment.

The Optical Activated Emergency Vehicle Preemption (EVP) Systems will be Model 721 Far Side as manufactured by Global Traffic Technologies or approved equal.

Confirmation lights will be wired with IMSA 19-1, 2, or 3 - #14 AWG stranded wire cable for single direction indication and IMSA 19-1, 3 - #14 AWG stranded wire cable for dual direction indications.

The interface card and card cage for the EVP system will be installed within the controller cabinet's rack mount. One 4-channel card will be installed in the controller cabinet.

The preemption and conductor cables for the detector heads will be installed without splices from the heads to the controller cabinets.



TRAFFIC SIGNAL CONTROLLER AND CONTROLLER CABINET

The traffic signal controller and controller cabinet will be furnished and installed by the Contractor to meet the specifications discussed in the special provisions. See the diagram below for signal controller cabinet details.

SIDE MOUNTED CABINET (FOR FIBER OPTIC CABLE)

The side mounted cabinet will house the fiber optic cable and will be furnished and installed by the Contractor.

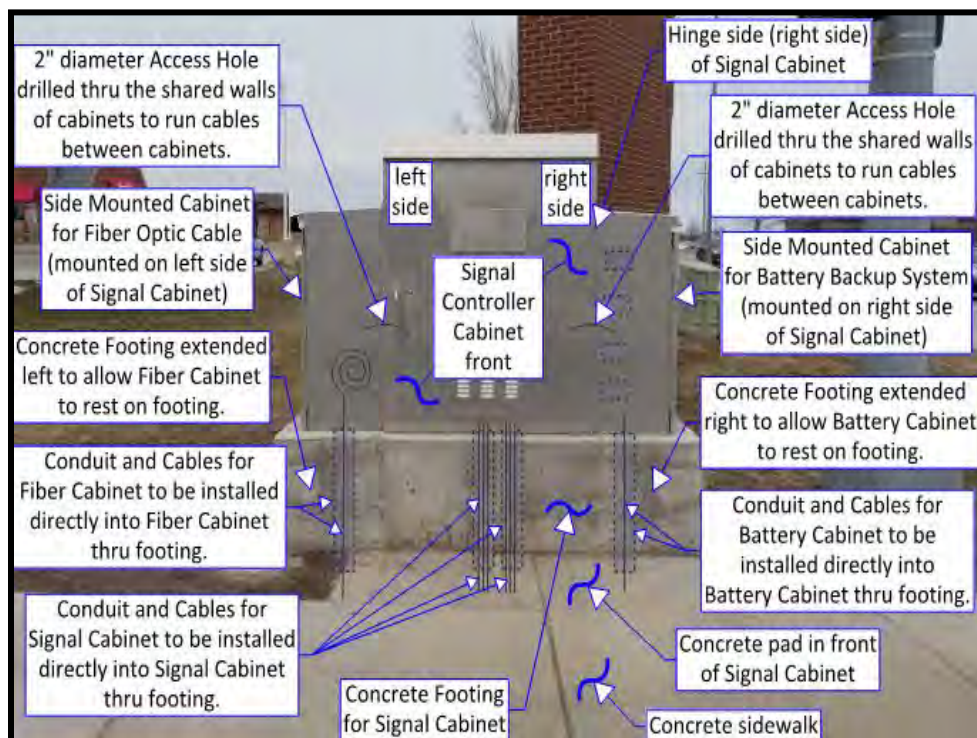
The side mounted cabinet will be mounted on the side of the signal controller cabinet as shown on the diagram below. The side mounted cabinet will:

- meet standards for a NEMA Traffic Enclosure for fiber optic cable
- have dimensions of 56"H, 26.25"W, 14.625"D
- be furnished with a door that includes ventilation louvers, fan, and filter
- be provided with a No. 2 key for the main door with a 3-point locking mechanism which operates from a single easy turning handle
- include at least 3 adjustable shelves
- have lockable doors that swing open towards the rear of the main cabinet (hinges located to rear with handle located at front)
- include LED lighting
- be manufactured by Southern Manufacturing or approved equal

The side mounted cabinet will be plumb and level in reference to the back side of the signal controller cabinet. The Contractor must take precautions when positioning the side mounted cabinet to avoid damaging wire or equipment within the controller cabinet while drilling the mounting holes and the access hole. The access hole will be two inch diameter and will be drilled through the side mounted cabinet into the controller cabinet. A grommet or bushing will be installed in the two inch diameter hole to prevent damage during pull through of the fiber optic cable.

The side mounted cabinet will be mounted and tightened securely to the controller cabinet using a minimum of four bolts. A bead of clear silicon caulking will be placed in all gaps between the side mounted cabinet and controller cabinet to prevent water intrusion into either cabinet.

All costs to furnish and install the side mounted cabinet, including the concrete base, will be included in the contract unit price per each for "Side Mounted Cabinet".



SIDE MOUNTED CABINET (FOR BATTERY BACKUP SYSTEM)

The side mounted cabinet will house the battery backup and flash system will be furnished and installed by the Contractor.

The side mounted cabinet for the battery backup and flash system will be mounted on the side of the signal controller cabinet as shown on the graphic on this sheet. The side mounted cabinet will:

- meet standards for a NEMA Traffic Enclosure
- have dimensions of 56"H, 26.25"W, 14.625"D
- be furnished with a door that includes ventilation louvers, fan, and filter
- be provided with a No. 2 key for the main door with a 3-point locking mechanism which operates from a single easy turning handle
- include the optional generator compartment and port / socket
- include shelves that are sized accommodate 220GXL AlphaCell Gel Top Terminal Batteries and that slide out to provide easy access to batteries for testing
- include an external LED indication light that will be activated when the cabinet is on generator power and utility power has been restored
- include LED lighting and a white powder-coated interior
- will have a thermostatically controlled exhaust fan and air filter
- be manufactured by Southern Manufacturing or approved equal

The side mounted cabinet will be plumb and level in reference to the back side of the controller cabinet. The Contractor must take precautions when positioning the side mounted cabinet to avoid damaging wire or equipment within the controller cabinet while drilling the mounting holes and the access hole. The access hole will be two inch diameter and will be drilled through the side mounted cabinet into the controller cabinet. A grommet or bushing will be installed in the two inch diameter hole to prevent damage during pull through of the battery / power cables.

The side mounted cabinet will be mounted and tightened securely to the controller cabinet using a minimum of four bolts. A bead of clear silicon caulking will be placed in all gaps between the side mounted cabinet and controller cabinet to prevent water intrusion into either cabinet.

All costs to furnish and install the side mounted cabinet, including the concrete base, will be included in the contract unit price per each for "Side Mounted Cabinet".

BATTERY BACKUP SYSTEM

The signal head battery backup and flash system will be furnished and installed by the Contractor.

The signal head battery backup and flash system will be Alpha Backup Power System—2000 VA Power Module as manufactured by Alpha Technologies or approved equal. The battery backup system will also be supplied with an automatic transfer switch to transfer from line power to battery backup and a generator transfer switch to allow switching from line power or battery power to generator power. The transfer switches will be capable of transferring power in under 250 milliseconds permitting the traffic signal to operate normally without interruption to the traffic signal.

A terminal strip for input and output power connections in addition to neutral and ground connections will also be incorporated in the transfer switch design. An interface connector (preferably utilizing a 30-amp, twist lock recessed male plug) allows an external generator or vehicle inverter to be plugged into the system.

Upon loss of utility power the battery backup system will switch to battery power. In cases of UPS failure, while on utility, the system will auto-bypass and remain in that mode until repaired. Should batteries deplete, while on batteries, the unit will auto-shutdown and return to normal operating mode once the utility power is restored. The By-pass switch will enable removal and replacement of the Traffic UPS without shutting down the traffic control system (i.e. "hot swap" capability). The UPS will support generator input without going to batteries.

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BATTERY BACKUP SYSTEM CONT'D

The backup battery power system will be sized to accommodate the operation of the signal as shown on the plans for a minimum of 4 hours.

The signal head battery backup and flash system will meet the following specifications:

Standard Features

Hot-swappable Input/Output Surge Protection
Intelligent boost operation for brownout protection
Hot-swappable UPS and batteries
Noise suppression, FCC Class A
Multiple mounting configurations
Rugged, outdoor weather resistant construction
Lockable enclosure
NRTL/CSA approved

General Specifications

Output:

Output Voltage Regulation +/-10% over input voltage range
Waveform sine
Typical Efficiency >95%
Typical Output Voltage THD <3%
Typical Transfer Time < 5 ms typical
Audible Noise at 1m <55 dbA

Environment:

Operating Temperature -35°C to +70°C

Agency Compliance:

Lightning/Surge Protection: Passes ANSI/IEEE C.62.41/C.62.45 Cat A&B
Safety: EN50091-1
Low Voltage: EN50091-2

Power Modules

2000VA Power Module	60Hz
Input/Output Voltage nominal	120VAC
Input/Output Frequency nominal	60Hz
Input Current	20A
Input Voltage Variation	85-152VAC
Output Power	2000VA
Active Output Power	1500W
Typical Efficiency	>95%
Max Charge Current	15 Amps
Battery Backup Time	2-16 hrs

Communications and Alarms

DB-9 compatible connector/RS-232 interface capable of monitoring, controlling, and calibrating the UPS, using ASCII commands with terminal emulation software.

External Alarm Signal with relay contacts for a) line fail, b) low battery warning, c) UPS needs service.

Brownout Protection

Boost mode increases voltage by 12% of nominal line voltage if input voltage falls below 12% of nominal.

All costs for furnishing and installing the signal head battery backup and flash system will be included in the contract unit price per each for "Battery Backup System for Traffic Signal".



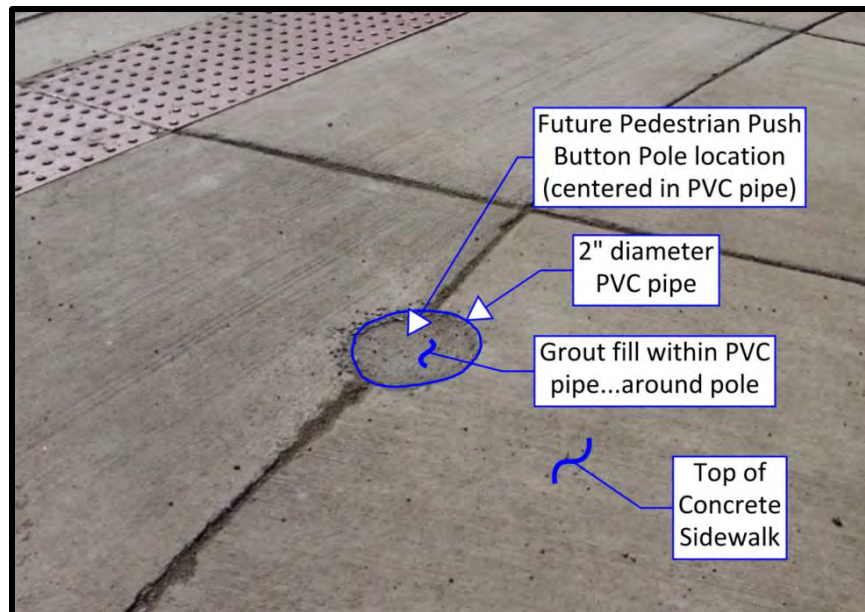
PEDESTRIAN PUSH BUTTON POLE

Push button poles will use a 48" schedule 40, 4" diameter, aluminum pipe screwed into a frangible pedestal base that is designed to break away at the flange and/or the mid-section around the door to preserve anchor bolts and concrete.

- The pedestal base will have a 6" bolt circle.
- 4 anchors made of stainless steel threaded rod, washers, and nuts will be drilled and epoxied into the concrete.
- A cable tether system will be used to connect the pole to one of the anchor bolts keeping the pole from becoming a projectile in the event of a knock down.
- Shop drawings for approval of the push buttons poles will be submitted.

At the intersections of Willow Run Entrance and Arrowhead Pkwy:

- No pedestrian push button posts are to be installed; however, the signal conduit will be installed to the future post locations as shown on the plans.
- At these future post locations, a 2" diameter Schedule 40 PVC pipe will be used to create a hole in the concrete where the future post will be installed.
- The PVC pipe will be centered about the future post location.
- The PVC pipe length will be adequate according to proposed concrete depth.
- The PVC pipe will permanently remain in the concrete.
- The top of the PVC pipe will be recessed 1/4" into the concrete.
- Upon installing the PVC pipe, the signal conduit (leading to the future pedestrian push button pole) will be installed up to the top of the PVC pipe. The top of the signal conduit will then be capped off.
- The PVC pipe hole will then be filled with gravel, with the top 2" of the hole being filled with grout. The grout will be blended into the surrounding concrete surface to be flush with the surface. It is anticipated this grout can be removed in the future and the pedestrian push button poles can be installed per the details.
- A diagram of the aforementioned items is shown in the diagram below.
- All costs for this work will be incidental to the bid item "Miscellaneous, Electrical".



ACCESSIBLE PEDESTRIAN SIGNAL

Accessible pedestrian push buttons will be in compliance with sections 4E.08 through 4E.13 of the 2009 MUTCD.

- Shop drawings for approval of the push buttons, including materials, functionality, and color will be submitted.
- Accessible pedestrian signals will have both audible and vibrotactile walk indications and will be capable of recording speech messages.
- Accessible pedestrian signals will be in compliance with all MUTCD and PROWAG guidance.

Pedestrian crossing signs will be required for each pedestrian push button and are allowed to be furnished with the button as a complete assembly. The pedestrian crossing signs will be paid for separately from the pedestrian push buttons. Shop drawings depicting the proposed pedestrian crossing sign size, design, and language will be submitted.

All costs for furnishing and installing the accessible pedestrian signal including labor, materials, and equipment, will be incidental to the contract unit price per each for "Accessible Pedestrian Signal".

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INNERDUCT

The innerduct conduit will be orange in color and longitudinally ribbed on the inside wall.

The innerduct bid items will include furnishing and installing the innerduct, as well as all work to seal the traffic interconnect conduit within the junction boxes. Innerduct ends will be sealed using a mastic style tape wrapped around the end of the innerduct and fiber optic cable. If innerduct is empty, a heat shrinkable cap will be installed over the end of the innerduct.

All costs for the innerduct will be included in the contract unit price per foot for "1" Innerduct, SDR 13.5" or "1.5" Innerduct SDR 13.5".

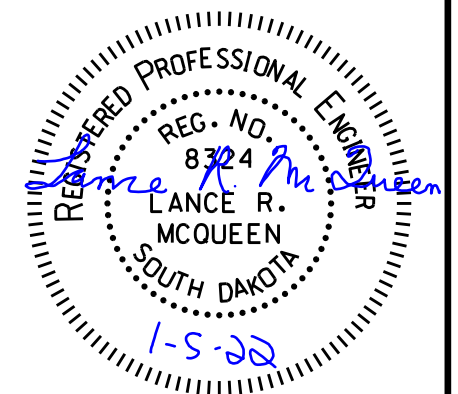
FIBER OPTIC CABLE

Fiber optic cable will be furnished and installed by the Contractor. Fiber optic cable will meet all requirements discussed in the City's specifications. Each fiber optic cable will have buffer tubes containing 12 fiber strands.

25 feet of fiber cable coil will be installed in the side mounted cabinet. The fiber optic cable will be installed continuous from traffic cabinet to traffic cabinet. No splices will be allowed in the fiber optic cable, except in the cabinets. All terminations and/or splicing will be completed by the City of Sioux Falls fiber optic specialist. For questions regarding the fiber optic cabling, contact Matt Rock at (605) 941-1143.

No testing will be completed on the fiber optic cable by the Contractor. All testing will be completed by the City outside of this project / contract. If repairs are needed to be completed by the Contractor due to deficiencies found by the City during their testing, the Contractor will repair the fiber optic cable as required to correct these deficiencies at no cost to the City.

All costs to furnish and install the 24SM fiber optic cable will be included in the contract unit price per foot for "24 Strand Fiber Optic Cable".



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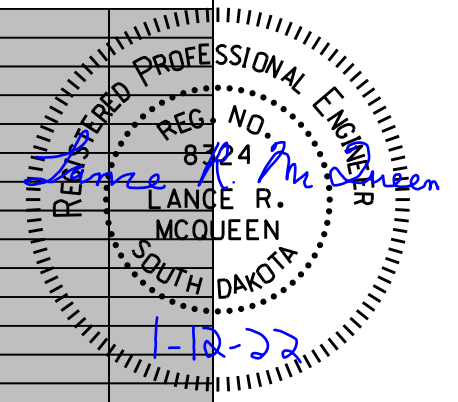
STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) NH 0042(63)371 P 1358(02)	SHEET NO. L9	TOTAL SHEETS L60
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TABLE FOR CONDUIT & CABLE QUANTITIES

Location to Location	PVC Conduit						Innerduct		Cable ¹																			
	Sch 40			Sch 80			SDR 13.5		2/2/2/4 (Ft)	3C #0000 (Ft)	1C #4 (Ft)	1C #6 (Ft)	1C #12 (Ft)	1C #14 (Ft)	2/C #14 (Ft)	3/C #14 (Ft)	5/C #14 (Ft)	7/C #14 (Ft)	25/C #14 (Ft)	Pole & Bracket (Ft)	PC (EVP & 3c) (Ft)	24SM FO (Ft)	Conduit ² Boring (Ft)	CAT5 ³ (video) (Ft)	CAT5 ⁴ (camera) (Ft)			
	1" (Ft)	2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	1" (Ft)	1.5" (Ft)																					
P 2042(29) - PCN 06YQ (west Arrowhead Pkwy)																												
SIGNALS																												
1/2 Mile Intersection																												
M1	CC1				25																							
CC1	JS3			100																								
JS3	S31		30																									
S31	PB3	10																										
S31	PB4	20																										
JS3	JS2				125																							
JS2	S30		15																									
S30	PB1	10																										
S30	PB2	20																										
JS2	JS1				75																							
JS1	L46		10																									
JS3	JS4				120																							
JS4	S32		10																									
S32	PB5	10																										
S32	PB6	20																										
JS4	JS5				105																							
JS5	S33		15																									
S33	PB7	10																										
S33	PB8	20																										
CC1	S30																				230				600		300	
CC1	S31																				110				340		170	
CC1	S32																				220				600		300	
CC1	S33																				340				800		400	
CC1	L46																										360	
	S30																											
	S31																											
	S32																											
	S33																											
S30	PB1																											
S30	PB2																											
S31	PB3																											
S31	PB4																											
S32	PB5																											
S32	PB6																											
S33	PB7																											
S33	PB8																											
P 2042(29) - PCN 06YQ Lighting Total:		0	2920	0	790	0	0	0	3345	350	280	0	0	155	0	0	0	0	0	1690	0	0	0	0	0	0	0	
P 2042(29) - PCN 06YQ Traffic Total:		120	80	100	100	350	14310	50	0	0	0	150	8700	0	280	120	445	415	900	0	2340	8350	450	1530	360			
P 2042(29) - PCN 06YQ Grand Total:		120	3000	100	890	350	14310	50	3345	350	280	150	8700	155	280	120	445	415	900	1690	2340	8350	450	1530	360			



1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.
 2 - Incidental to "Miscellaneous, Electrical" bid item.
 3 - Incidental to "Video Detection System" bid item.
 4 - Incidental to "Surveillance Camera" bid item.

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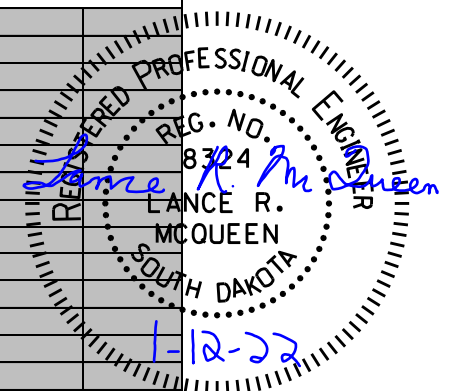
STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) NH 0042(63)371 P 1358(02)	SHEET NO. L10	TOTAL SHEETS L60
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Plotting Date: 1/1/2022

REV DATE: 1/12/2022 INITIAL: LRM

TABLE FOR CONDUIT & CABLE QUANTITIES

Location to Location		PVC Conduit					Innerduct		Cable ¹																
		Sch 40			Sch 80		SDR 13.5		2/2/2/4	3C #0000	1C #4	1C #6	1C #12	1C #14	2/C #14	3/C #14	5/C #14	7/C #14	25/C #14	Pole & Bracket	PC (EVP & 3c)	24SM FO	Conduit ² Boring	CAT5 ³ (video)	CAT5 ⁴ (camera)
		1" (Ft)	2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	1" (Ft)	1.5" (Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
NH 0042(63)371 - PCN 05C6 (east Arrowhead Pkwy)																									
LIGHTING																									
L11	L12	260							270											260					
L12	L13	240							250											130					
L13	L14	265							275											130					
L14	L15	260							275											130					
L15	L16	260							275											130					
L16	L17	275							285											130					
L17	L18	295							305											130					
L18	L19	280							290											130					
L19	JL14				60				65																
JL14	JL16				135				145																
JL16	M3				40					120			25												
Transformer	JL15				90				110																
JL15	JL17				160				180																
JL17	M3				15				30																
JL16	JL18				150								160												
JL18	JL19				100								110												
FIBER																									
JF20	JF23							700					710												
JF23	JF24							1020					1030												
JF24	JF25							1010					1020												
JF25	JF26							1010					1020												
JF26	JF27							660					670												
JF27	JF28							260					270												
JF28	JF29							300					310												
JF29	JF30							210					220												
JF30	JF27							250					260												
SIGNALS																									
Willow Run Entrance																									
JS12	JS13	10											15												
JS13	FPB1	10											15												
JS13	FPB2	20											25												
JS12	JS15					105							110												
JS15	JS14	25											30												
JS14	FPB3	10											15												
JF14	FPB4	20											25												
JS15	JS18					150							160												
JS18	JS17	10											15												
JS17	FPB5	10											15												
JS17	FPB6	20											25												
JS18	JS20					95							100												
JS20	JS19	20											25												
JS19	FPB7	10											15												
JS19	FPB8	20											25												
NH 0042(63)371 - PCN 05C6 Lighting Total:		0	2135	0	750	0	0	0	2435	320	120	0	0	295	0	0	0	0	0	1170	0	0	0	0	0
NH 0042(63)371 - PCN 05C6 Traffic Total:		120	65	0	0	350	5420	0	0	0	0	0	6125	0	0	0	0	0	0	0	0	0	0	0	0
NH 0042(63)371 - PCN 05C6 Gand Total:		120	2200	0	750	350	5420	0	2435	320	120	0	6125	295	0	0	0	0	0	1170	0	0	0	0	0



1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.
 2 - Incidental to "Miscellaneous, Electrical" bid item.
 3 - Incidental to "Video Detection System" bid item.
 4 - Incidental to "Surveillance Camera" bid item.



FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) NH 0042(63)371 P 1358(02)	SHEET NO. L11	TOTAL SHEETS L60
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TABLE FOR CONDUIT & CABLE QUANTITIES

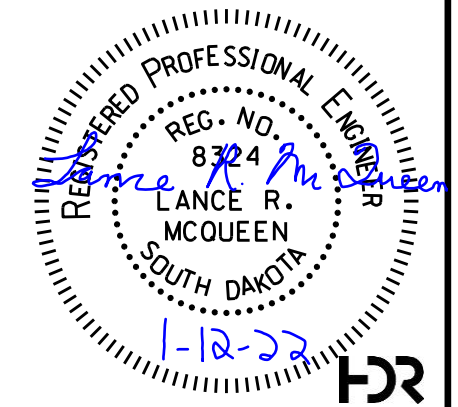
Location to Location	PVC Conduit						Innerduct		Cable ¹																	
	Sch 40			Sch 80			SDR 13.5		2/2/2/4	3C #0000	1C #4	1C #6	1C #12	1C #14	2/C #14	3/C #14	5/C #14	7/C #14	25/C #14	Pole & Bracket	PC (EVP & 3c)	24SM FO	Conduit ² Boring	CAT5 ³ (video)	CAT5 ⁴ (camera)	
	1" (Ft)	2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	1" (Ft)	1.5" (Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	
P 1358(02) - PCN 05C2 (Six Mile Road)																										
LIGHTING																										
Transformer	JL11				30					50																
JL11	M2				15					30																
JL11	M4				15					30																
M2	JL8				80						350															
M4	JL8				80						350															
L10	JL7				65					70																
JL7	JL8				185					190																
JL8	JL12				125					130																
JL8	JL13				85					90																
JL13	L11		25							35																
JL20	JL21		170		80																					
JL21	JL23		200		90																					
JL23	JL9		70																							
JL9	JL10				30																					
LB2	SXL4		100																							
SXL4	SXL5		190							200																
SXL5	SXL6		200							210																
SXL6	JL22		10							15																
JL22	JL8				115					120																
JL12	SXL7				140					155																
SXL7	SXL8		195							210																
SXL8	SXL9		175							190																
SXL9	SXL10		170							180																
SXL10	JL24				50					55																
JL24	SXL11		165							175																
SXL11	SXL12		145							155																
SXL12	SXL13		65		90					165																
SXL13	SXL14		155							170																
SXL14	SXL15		135							140																
SXL15	to south		5																							

1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.

2 - Incidental to "Miscellaneous, Electrical" bid item.

3 - Incidental to "Video Detection System" bid item.

4 - Incidental to "Surveillance Camera" bid item.



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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) NH 0042(63)371 P 1358(02)	SHEET NO. L12	TOTAL SHEETS L60
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TABLE FOR CONDUIT & CABLE QUANTITIES

Location to Location	PVC Conduit					Innerduct		Cable ¹																	
	Sch 40			Sch 80		SDR 13.5		2/2/2/4	3C #0000	1C #4	1C #6	1C #12	1C #14	2/C #14	3/C #14	5/C #14	7/C #14	25/C #14	Pole & Bracket	PC (EVP & 3c)	24SM FO	Conduit ² Boring	CAT5 ³ (video)	CAT5 ⁴ (camera)	
	1" (Ft)	2" (Ft)	4" (Ft)	2" (Ft)	3" (Ft)	1" (Ft)	1.5" (Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	
P 1358(02) - PCN 05C2 (Six Mile Road)																									
FIBER																									
JF31	JF32					500																			
JF32	JF33					570																			
JF33	JF20					140																			
CC2	JF20						50														400				
JF20	JF21					250																			
JF21	JF22					370																			
JF22	JF19					270																			
JF19	JF20					400																			
JF21	JF34					170																			
JF34	JF35					630																			
JF35	JF36					440																			
JF36	JF37					920																			
JF37	JF38					580																			

1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.
 2 - Incidental to "Miscellaneous, Electrical" bid item.
 3 - Incidental to "Video Detection System" bid item.
 4 - Incidental to "Surveillance Camera" bid item.



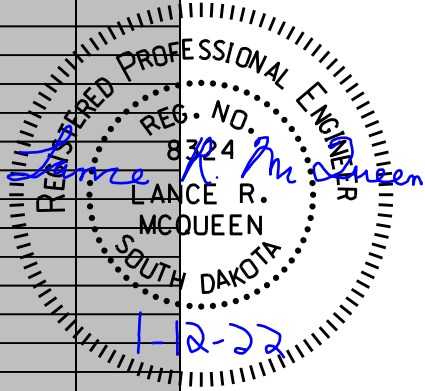
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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) NH 0042(63)371 P 1358(02)	SHEET NO. L13	TOTAL SHEETS L60
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Plotting Date: 1/1/2022

REV DATE: 1/12/2022 INITIAL: LRM

TABLE FOR CONDUIT & CABLE QUANTITIES																									
Location to Location		PVC Conduit					Innerduct		Cable ¹																
		Sch 40			Sch 80		SDR 13.5		2/2/2/4	3C #0000	1C #4	1C #6	1C #12	1C #14	2/C #14	3/C #14	5/C #14	7/C #14	25/C #14	Pole & Bracket	PC (EVP & 3c)	24SM FO	Conduit ² Boring	CAT5 ³ (video)	CAT5 ⁴ (camera)
		1"	2"	4"	2"	3"	1"	1.5"	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)	(Ft)
P 1358(02) - PCN 05C2 (Six Mile Road)																									
SIGNALS																									
Six Mile Road																									
M2	CC2				25																				
CC2	JS8			60																					
JS8	S2		40																						
S2	PB11	10																							
S2	PB12	20																							
JS8	JS7					185																			
JS7	JS6			70																					
JS6	L10		10																						
JS7	S1		15																						
S1	PB9	10																							
S1	PB10	20																							
JS8	JS9					135																			
JS9	S3		15																						
S3	PB13	30																							
S3	PB14	40																							
JS9	JS10					170																			
JS10	S4		40																						
S4	PB15	20																							
S4	PB16	30																							
CC2	S1																	260		700			350		
CC2	S2																	100		370			185		
CC2	S3																	230		600			300		
CC2	S4																	410		900			450		
CC2	L10																						325	325	
	S1																								
	S2																								
	S3																								
	S4																								
S1	PB9																								
S1	PB10																								
S2	PB11																								
S2	PB12																								
S3	PB13																								
S3	PB14																								
S4	PB15																								
S4	PB16																								
P 1358(02) - PCN 05C2 Lighting Total:		0	2175	0	1275	0	0	0	2655	110	700	0	0	765	0	0	0	0	1045	0	0	0	0	0	
P 1358(02) - PCN 05C2 Traffic Total:		180	120	60	95	490	5240	50	0	0	0	150	6400	0	340	120	630	495	1000	0	2570	400	0	1610	325
P 1358(02) - PCN 05C2 Grand Total:		180	2295	60	1370	490	5240	50	2655	110	700	150	6400	765	340	120	630	495	1000	1045	2570	400	0	1610	325

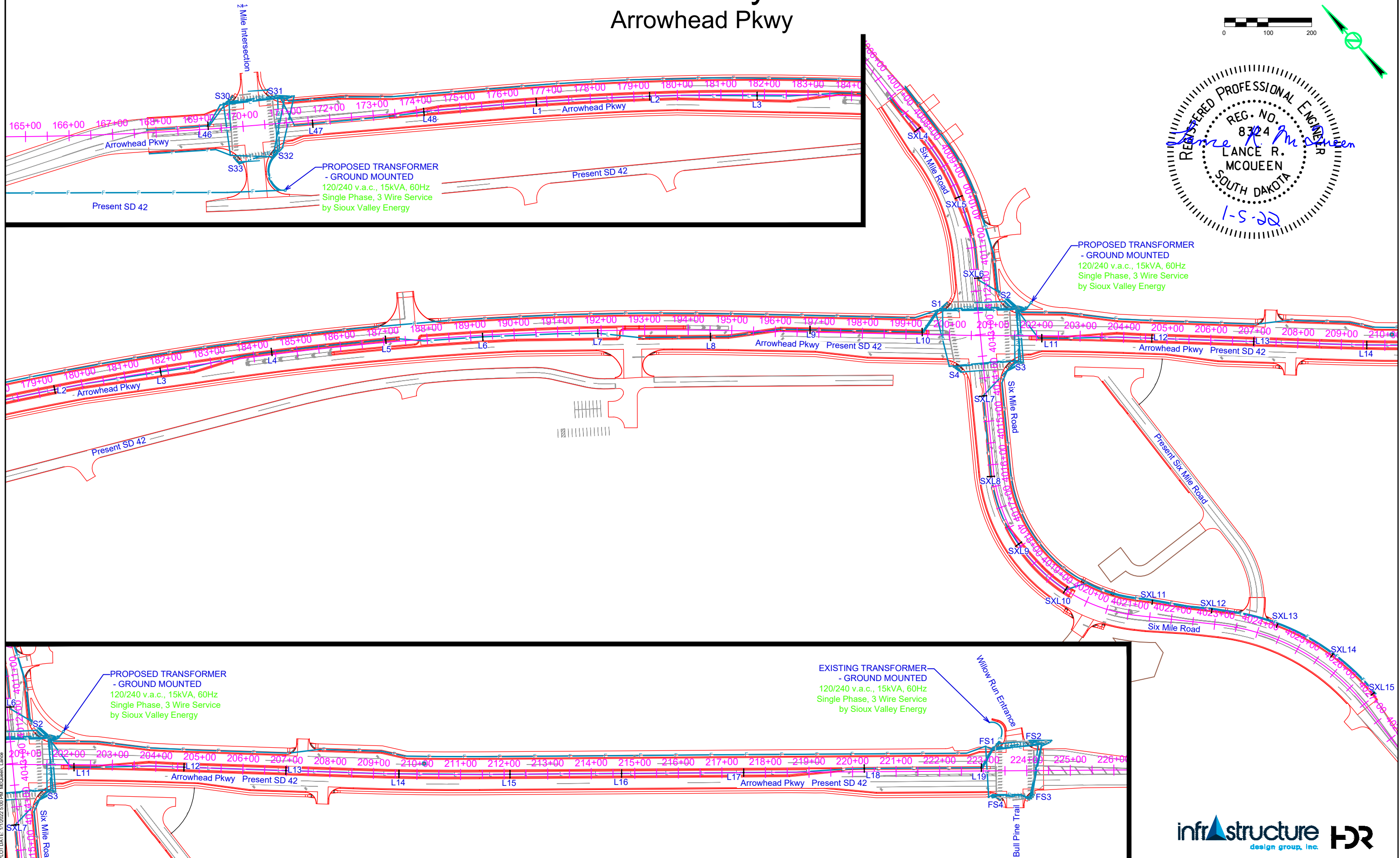
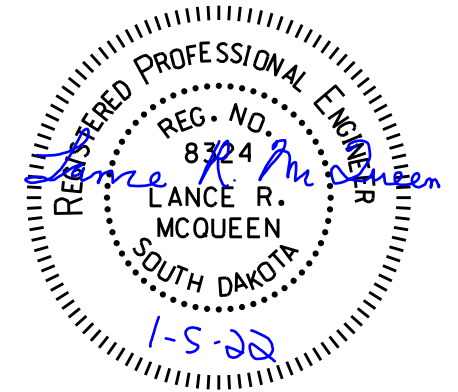
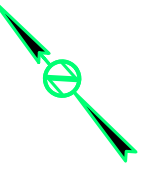


1 - All cable quantities shown include 6' of slack/coil installed in each junction box, unless shown otherwise.
 2 - Incidental to "Miscellaneous, Electrical" bid item.
 3 - Incidental to "Video Detection System" bid item.
 4 - Incidental to "Surveillance Camera" bid item.

Overall Layout Arrowhead Pkwy

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L14	L60

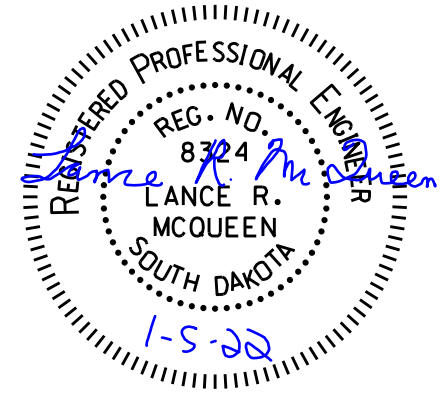


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11/15/2022 10:30 AM L14 McQueen, Lance

Existing Signal Layout FOR BIDDING PURPOSES ONLY

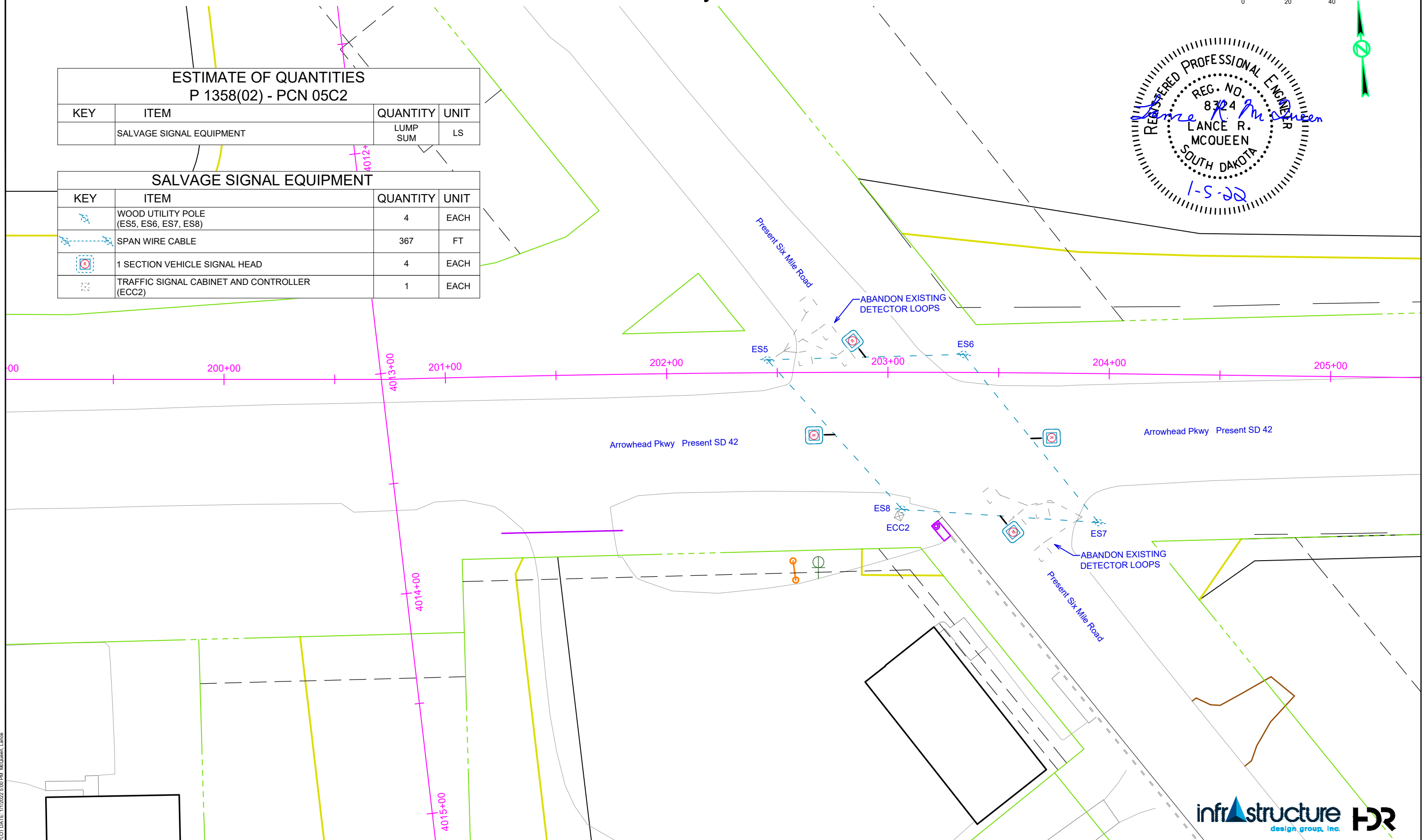
Arrowhead Pkwy & Six Mile Road

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L15	L60



ESTIMATE OF QUANTITIES P 1358(02) - PCN 05C2			
KEY	ITEM	QUANTITY	UNIT
	SALVAGE SIGNAL EQUIPMENT	LUMP SUM	LS

SALVAGE SIGNAL EQUIPMENT			
KEY	ITEM	QUANTITY	UNIT
	WOOD UTILITY POLE (ES5, ES6, ES7, ES8)	4	EACH
	SPAN WIRE CABLE	367	FT
	1 SECTION VEHICLE SIGNAL HEAD	4	EACH
	TRAFFIC SIGNAL CABINET AND CONTROLLER (ECC2)	1	EACH



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 1/1/2022 10:03 PM Lance R. McQueen, Linc.

Signal Layout

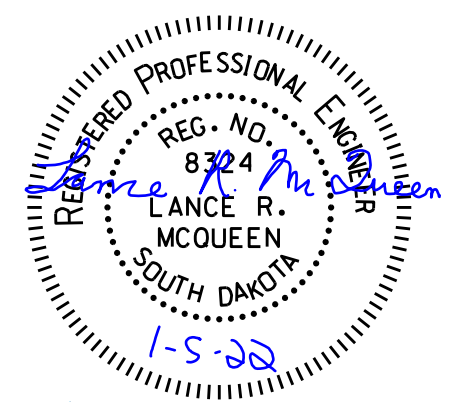
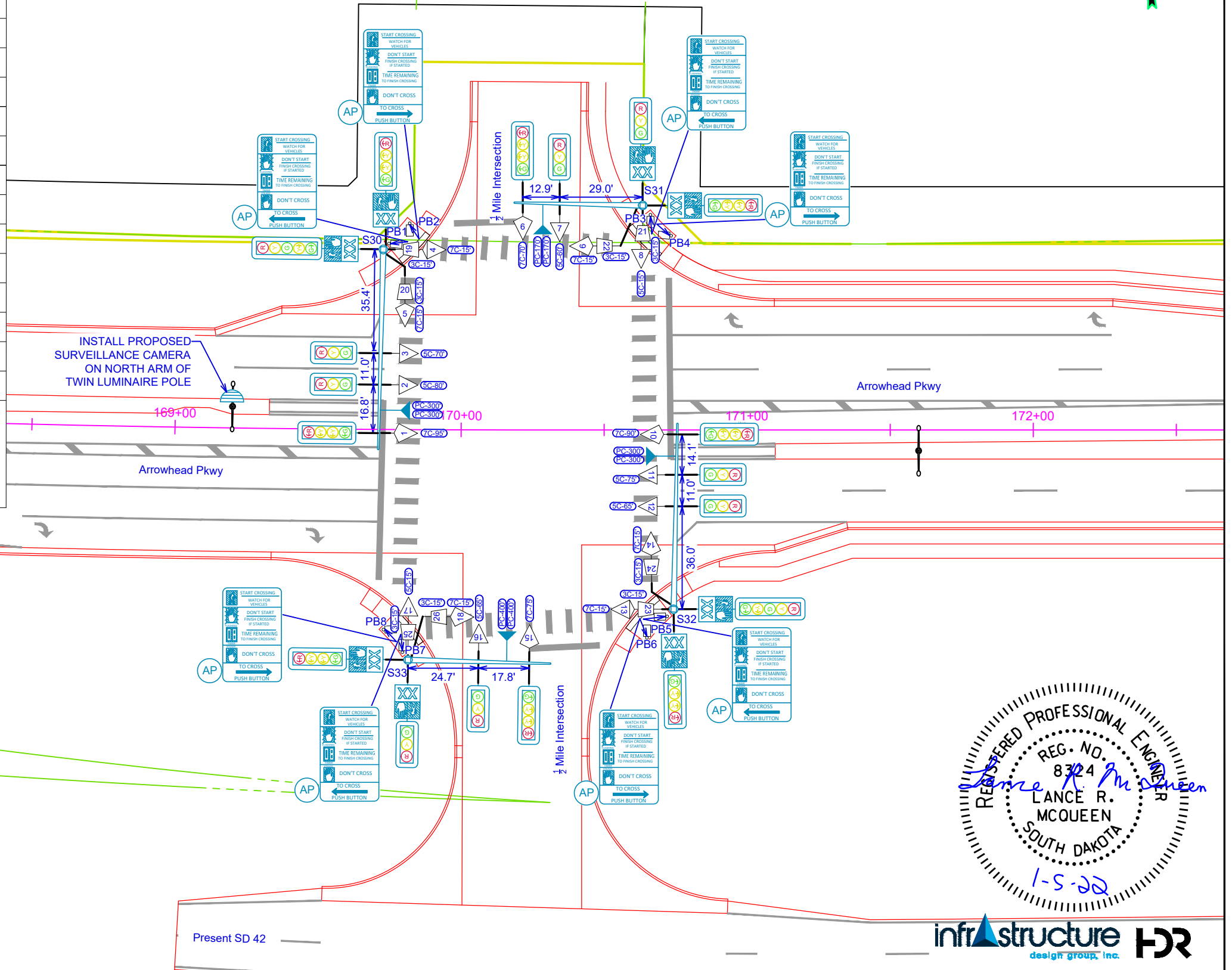
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L16	TOTAL SHEETS L60
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Arrowhead Pkwy & 1/2 Mile Intersection



ESTIMATE OF QUANTITIES NH 2042(29) - PCN 06YQ			
KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE W/ 45' MAST ARM (S31)	1	EACH
	SIGNAL POLE W/ 50' MAST ARM (S33)	1	EACH
	SIGNAL POLE W/ 65' MAST ARM (S32)	1	EACH
	SIGNAL POLE W/ 70' MAST ARM (S30)	1	EACH
	3 SECTION VEHICLE SIGNAL HEAD (2,3,7,8,11,12,16,17)	8	EACH
	4 SECTION VEHICLE SIGNAL HEAD (1,5,6,9,10,14,15,18)	8	EACH
	5 SECTION VEHICLE SIGNAL HEAD (4,13)	2	EACH
	3' DIAMETER FOOTING (S30-S33)	60.0	FT
	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER (19-26)	8	EACH
	EMERGENCY VEHICLE PREEMPTION UNIT (4-CHANNEL)	1	EACH
	OPTICAL DETECTOR	4	EACH
	SURVEILLANCE CAMERA	1	EACH
	ACCESSIBLE PEDESTRIAN SIGNAL	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB1-PB8)	8	EACH
	PEDESTRIAN CROSSING SIGN (R10-3e) (LEFT-4, RIGHT-4)	8	EACH



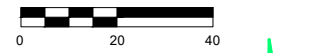
Present SD 42

Signal Layout

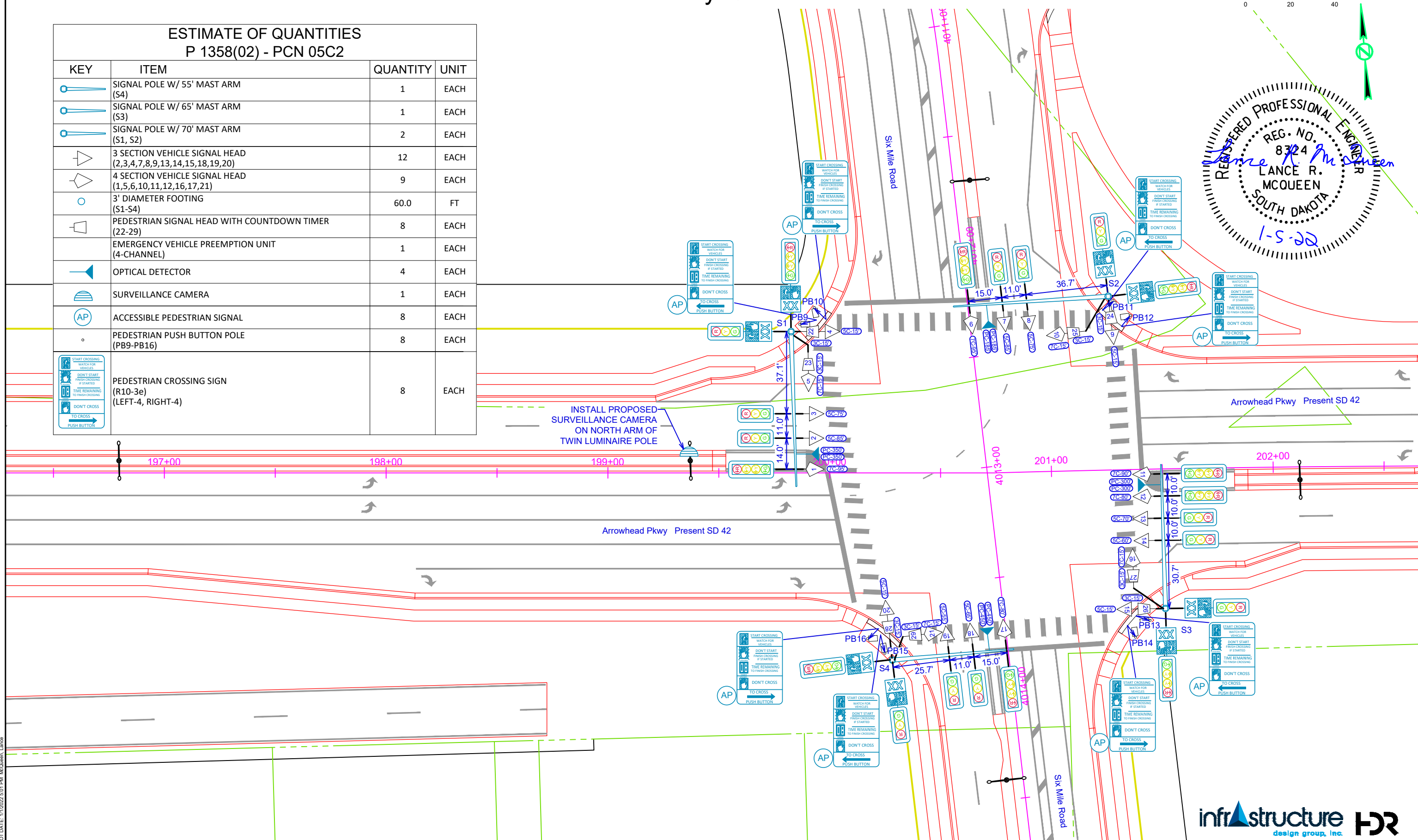
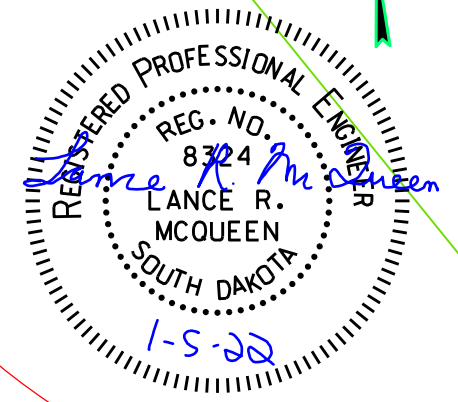
Arrowhead Pkwy & Six Mile Road

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L17	TOTAL SHEETS L60
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ESTIMATE OF QUANTITIES P 1358(02) - PCN 05C2			
KEY	ITEM	QUANTITY	UNIT
	SIGNAL POLE W/ 55' MAST ARM (S4)	1	EACH
	SIGNAL POLE W/ 65' MAST ARM (S3)	1	EACH
	SIGNAL POLE W/ 70' MAST ARM (S1, S2)	2	EACH
	3 SECTION VEHICLE SIGNAL HEAD (2,3,4,7,8,9,13,14,15,18,19,20)	12	EACH
	4 SECTION VEHICLE SIGNAL HEAD (1,5,6,10,11,12,16,17,21)	9	EACH
	3' DIAMETER FOOTING (S1-S4)	60.0	FT
	PEDESTRIAN SIGNAL HEAD WITH COUNTDOWN TIMER (22-29)	8	EACH
	EMERGENCY VEHICLE PREEMPTION UNIT (4-CHANNEL)	1	EACH
	OPTICAL DETECTOR	4	EACH
	SURVEILLANCE CAMERA	1	EACH
	ACCESSIBLE PEDESTRIAN SIGNAL (AP)	8	EACH
	PEDESTRIAN PUSH BUTTON POLE (PB9-PB16)	8	EACH
	PEDESTRIAN CROSSING SIGN (R10-3e) (LEFT-4, RIGHT-4)	8	EACH

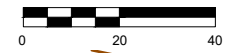


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1/17/2022 10:17 AM mcmquene

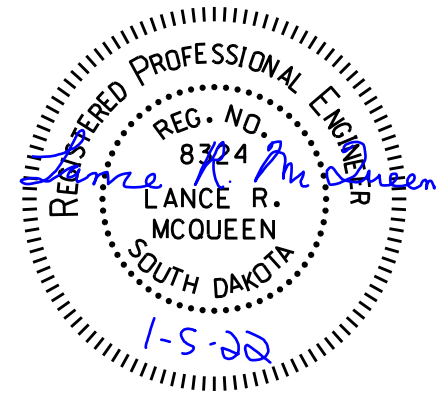
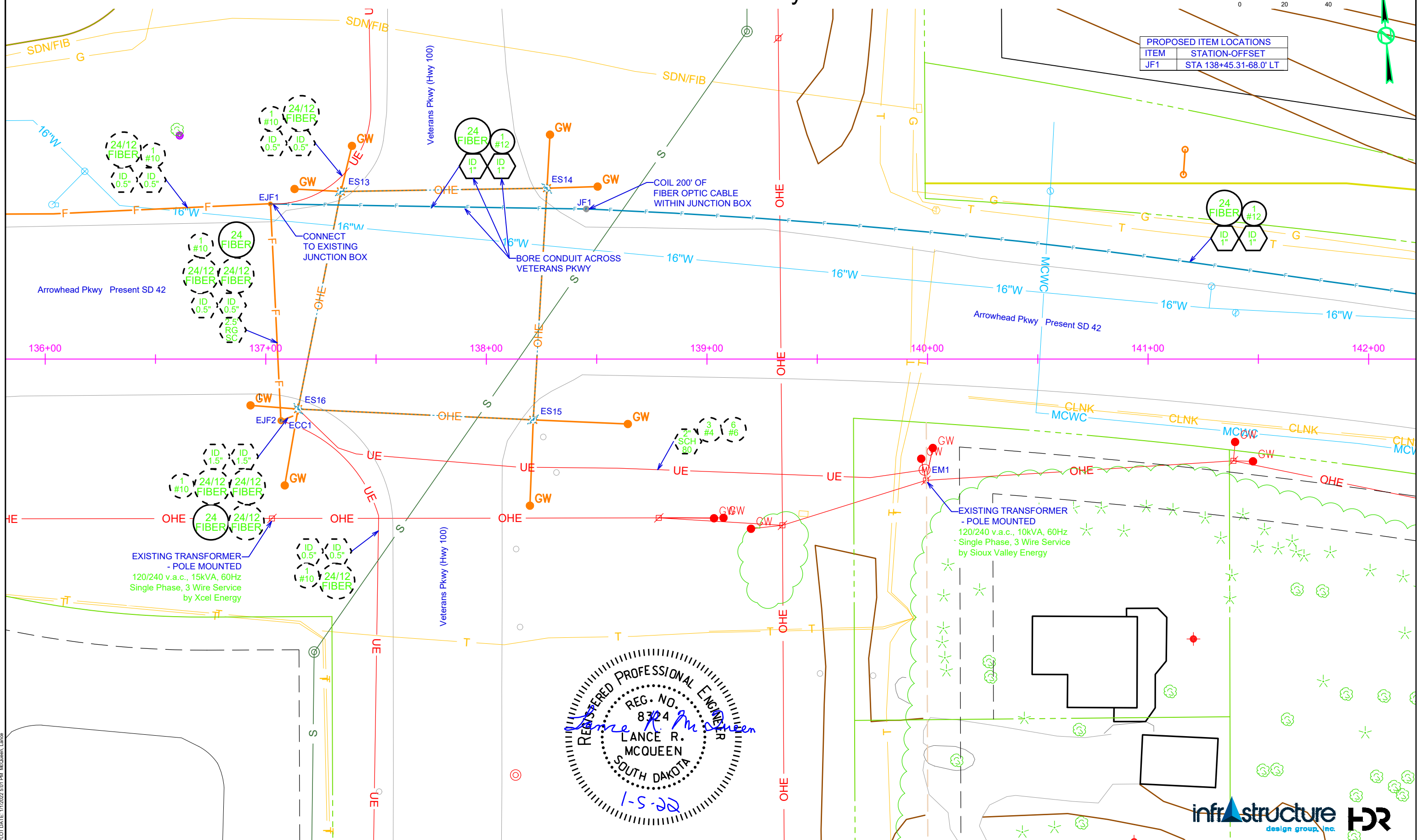
Conduit Layout Arrowhead Pkwy

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L19	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
JF1	STA 138+45.31-68.0' LT



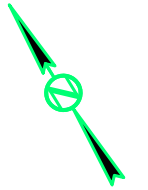
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Conduit Layout

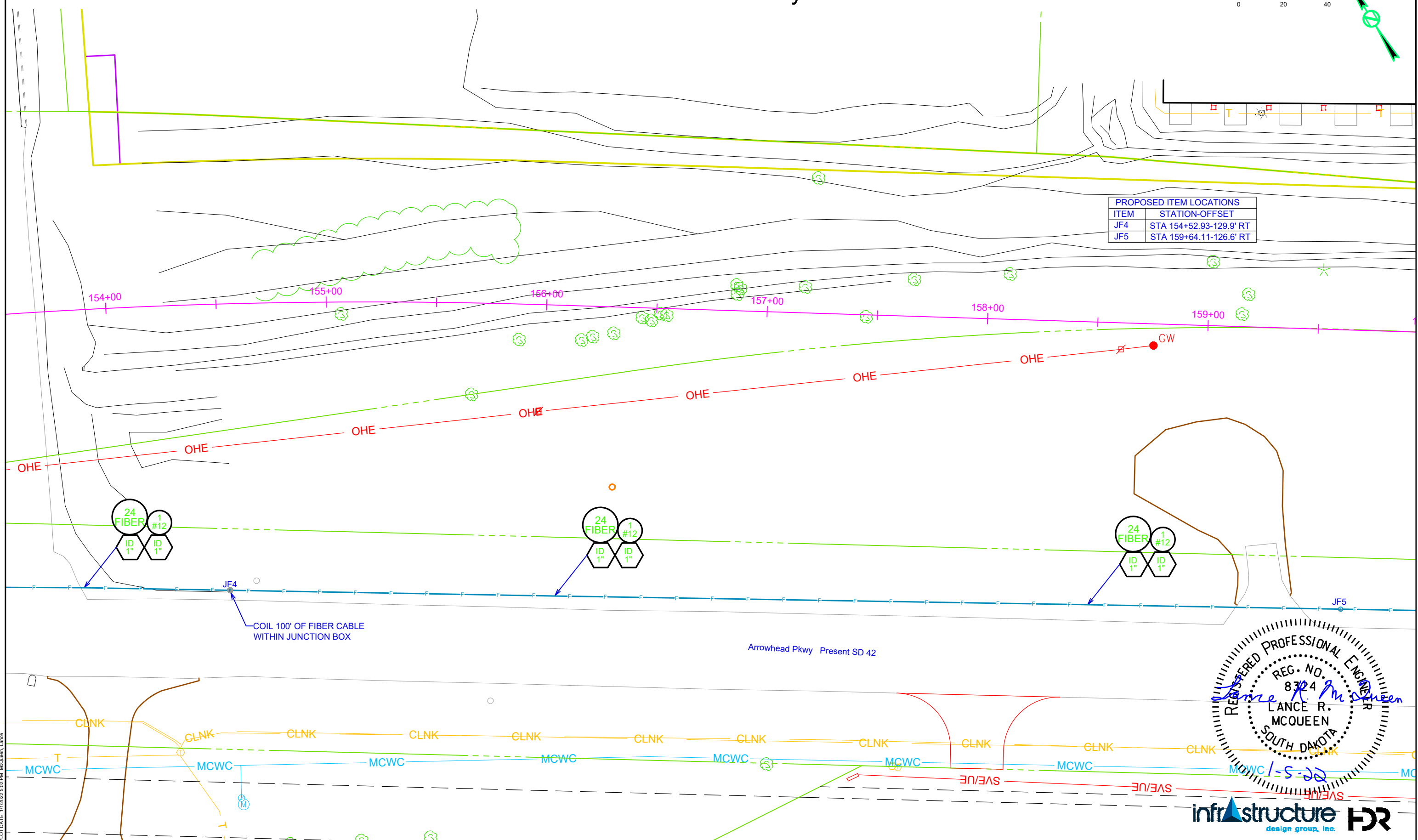
Arrowhead Pkwy

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L22	TOTAL SHEETS L60
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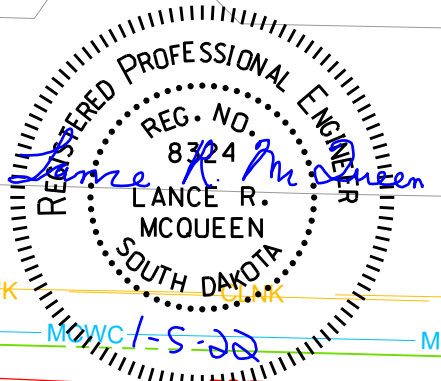


PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
JF4	STA 154+52.93-129.9' RT
JF5	STA 159+64.11-126.6' RT



COIL 100' OF FIBER CABLE WITHIN JUNCTION BOX

Arrowhead Pkwy Present SD 42



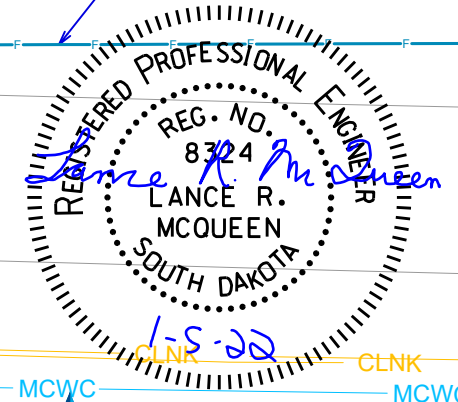
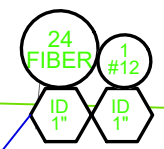
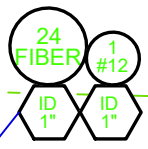
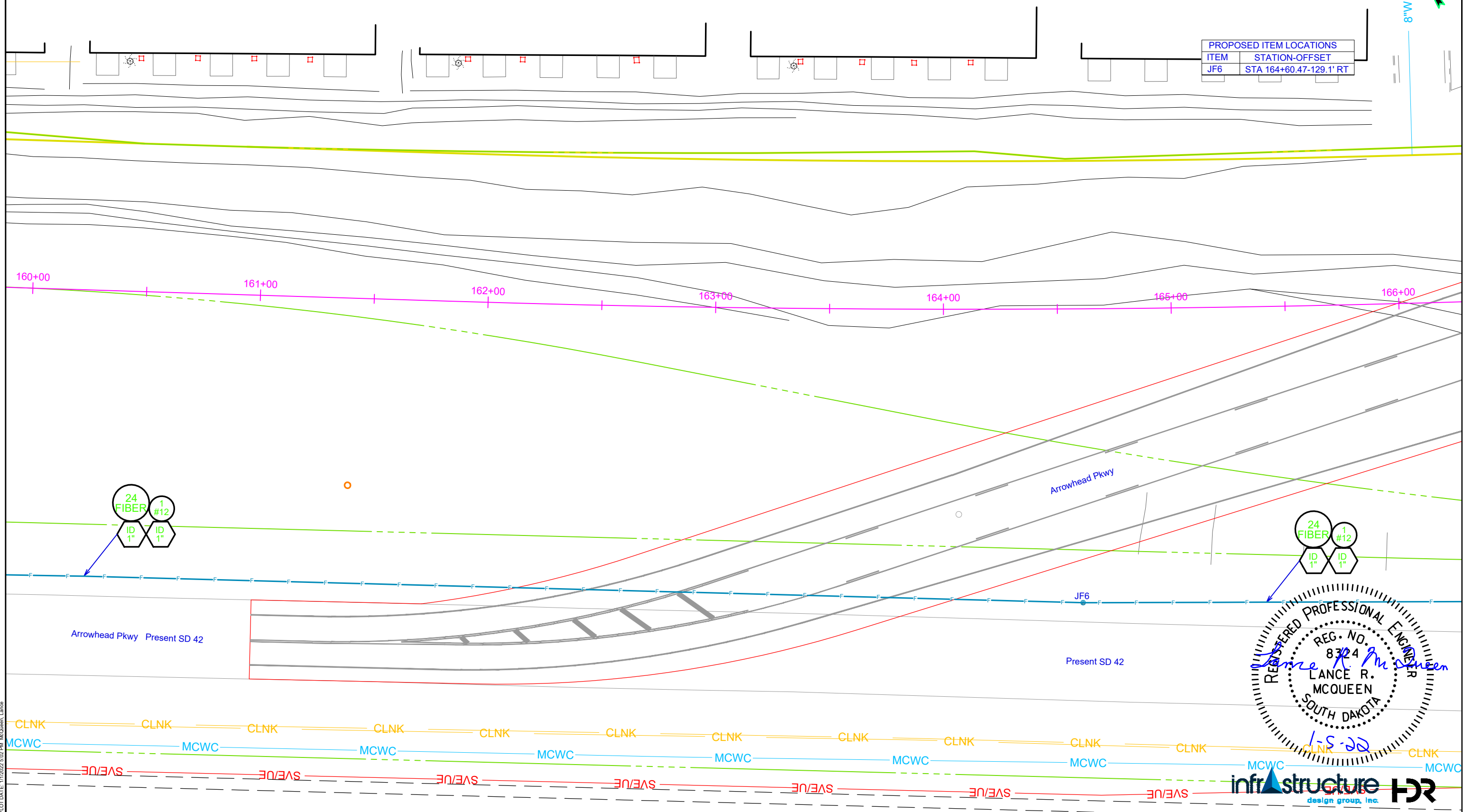
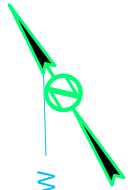
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 11/22/22 10:28 AM MCGUINN, LANCE

Conduit Layout

Arrowhead Pkwy

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L23	L60



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LANCE R. MCQUEEN, LENSE

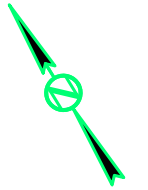


Conduit Layout

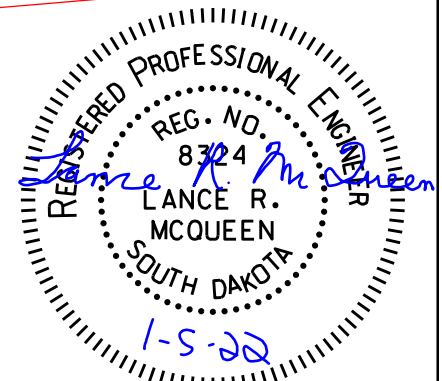
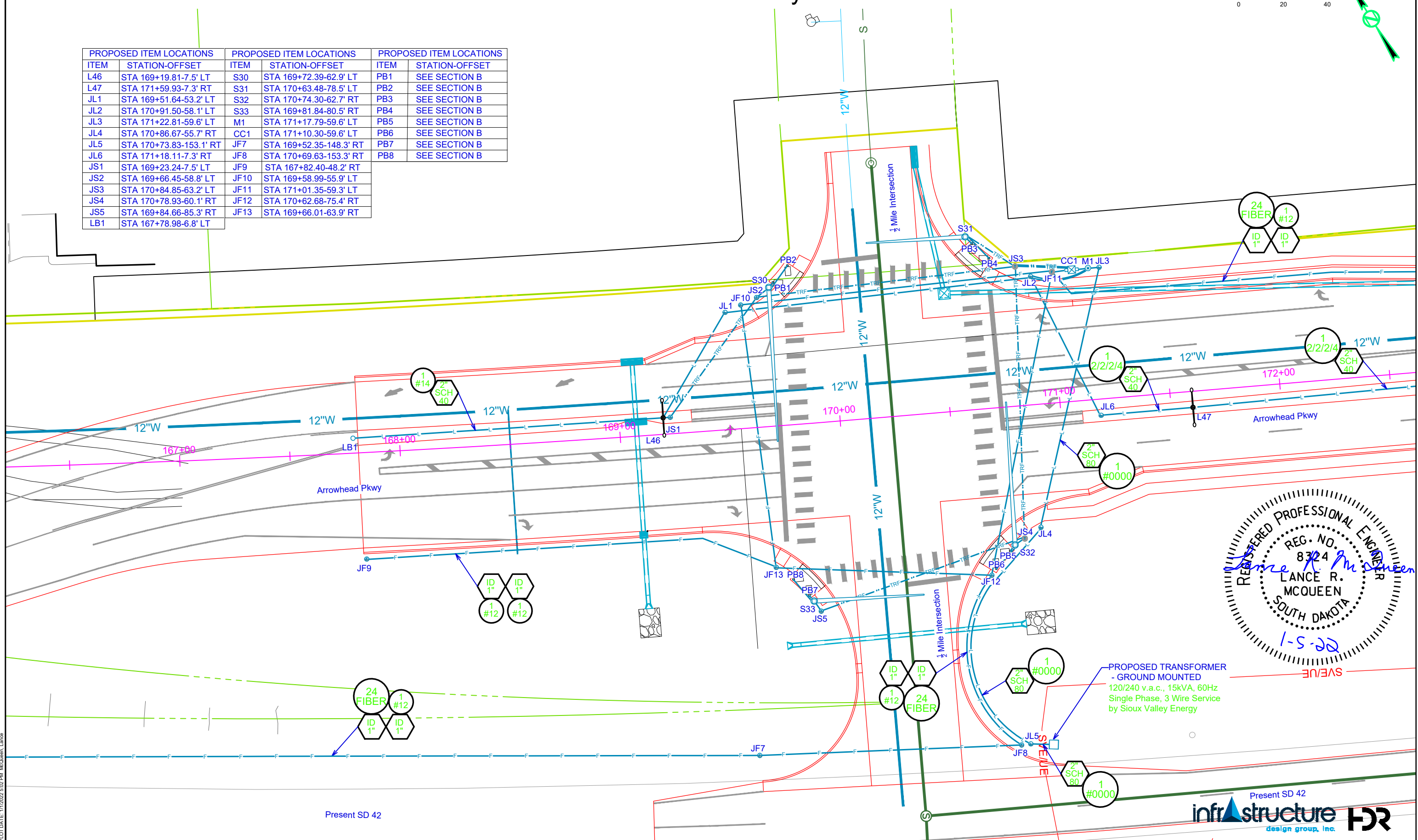
Arrowhead Pkwy

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L24	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET	ITEM	STATION-OFFSET
L46	STA 169+19.81-7.5' LT	S30	STA 169+72.39-62.9' LT	PB1	SEE SECTION B
L47	STA 171+59.93-7.3' RT	S31	STA 170+63.48-78.5' LT	PB2	SEE SECTION B
JL1	STA 169+51.64-53.2' LT	S32	STA 170+74.30-62.7' RT	PB3	SEE SECTION B
JL2	STA 170+91.50-58.1' LT	S33	STA 169+81.84-80.5' RT	PB4	SEE SECTION B
JL3	STA 171+22.81-59.6' LT	M1	STA 171+17.79-59.6' LT	PB5	SEE SECTION B
JL4	STA 170+86.67-55.7' RT	CC1	STA 171+10.30-59.6' LT	PB6	SEE SECTION B
JL5	STA 170+73.83-153.1' RT	JF7	STA 169+52.35-148.3' RT	PB7	SEE SECTION B
JL6	STA 171+18.11-7.3' RT	JF8	STA 170+69.63-153.3' RT	PB8	SEE SECTION B
JS1	STA 169+23.24-7.5' LT	JF9	STA 167+82.40-48.2' RT		
JS2	STA 169+66.45-58.8' LT	JF10	STA 169+58.99-55.9' LT		
JS3	STA 170+84.85-63.2' LT	JF11	STA 171+01.35-59.3' LT		
JS4	STA 170+78.93-60.1' RT	JF12	STA 170+62.68-75.4' RT		
JS5	STA 169+84.66-85.3' RT	JF13	STA 169+66.01-63.9' RT		
LB1	STA 167+78.98-6.8' LT				



PROPOSED TRANSFORMER
 - GROUND MOUNTED
 120/240 v.a.c., 15kVA, 60Hz
 Single Phase, 3 Wire Service
 by Sioux Valley Energy

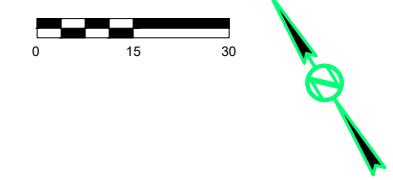
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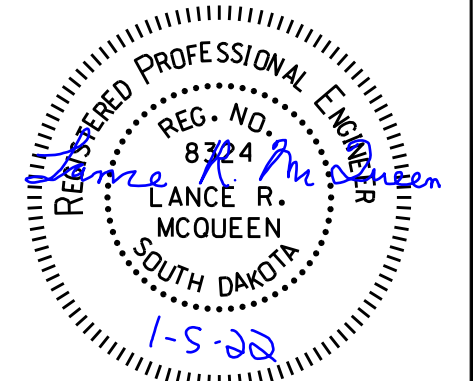
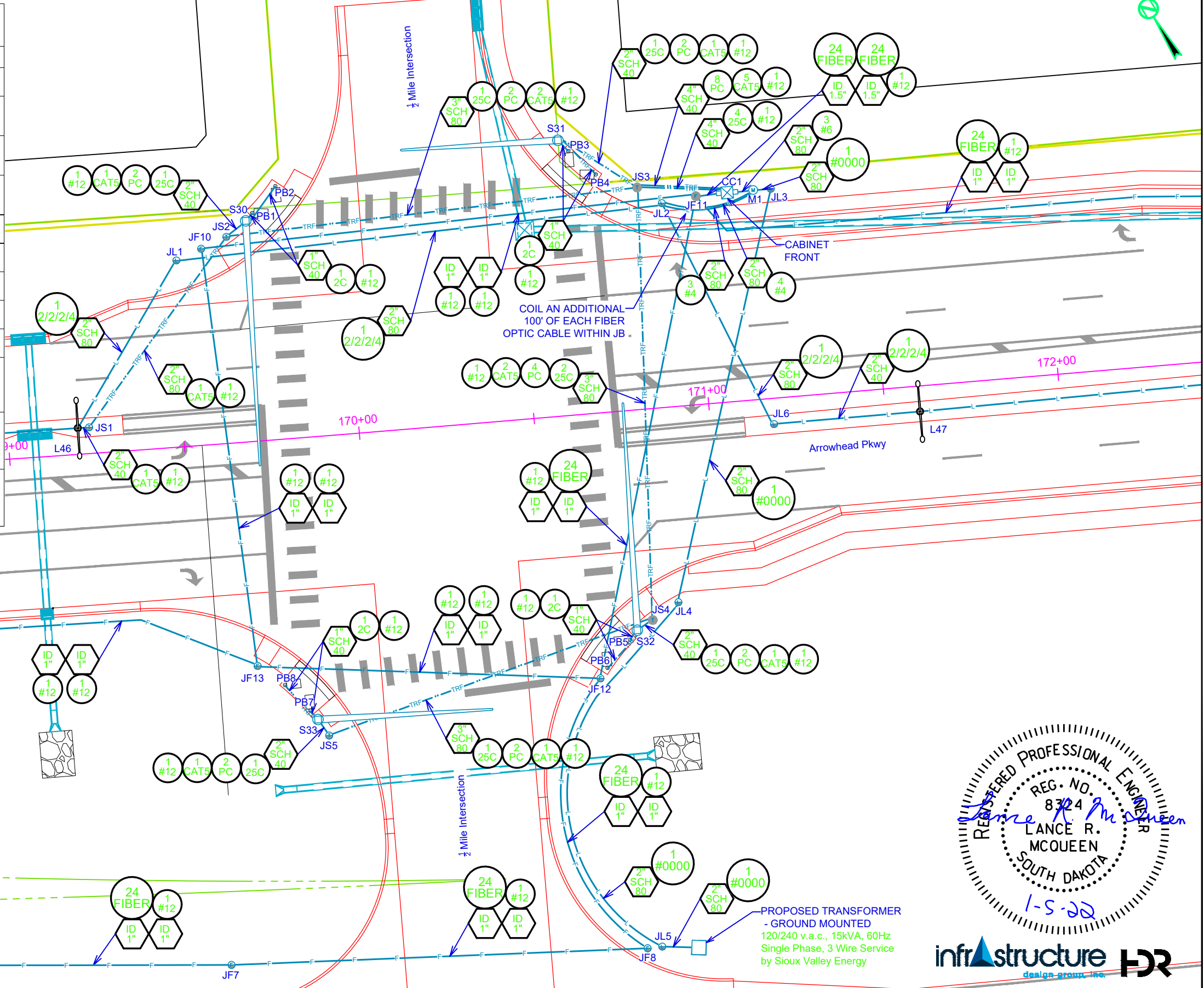
Signal Conduit Layout FOR BIDDING PURPOSES ONLY

Arrowhead Pkwy & 1/2 Mile Intersection

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L25	TOTAL SHEETS L60
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ESTIMATE OF QUANTITIES NH 2042(29) - PCN 06YQ			
KEY	ITEM	QUANTITY	UNIT
	TRAFFIC SIGNAL CONTROLLER (FRONT OF CABINET / DOOR)	1	EACH
	SIDE MOUNTED CABINET (FOR BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
	BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL (INSTALLED WITHIN SIDE MOUNTED CABINET) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
	SIDE MOUNTED CABINET (FOR FIBER OPTIC CABLE) (INSTALLED ON LEFT SIDE OF CABINET FRONT)	1	EACH
	2/C #14 AWG IMSA COPPER CABLE, K1 (TO PEDESTRIAN PUSH BUTTON)	280	FT
	3/C #14 AWG IMSA COPPER CABLE, K1 (TO PEDESTRIAN SIGNAL HEADS)	120	FT
	5/C #14 AWG IMSA COPPER CABLE, K1 (TO 3 SECTION SIGNAL HEADS)	445	FT
	7/C #14 AWG IMSA COPPER CABLE, K1 (TO 4 SECTION AND 5 SECTION SIGNAL HEADS)	415	FT
	25/C #14 AWG IMSA COPPER CABLE, K1 (TO SIGNAL BASES)	900	FT
	PREEMPTION CABLE (TO OPTICAL DETECTORS) (1 PC FOR THE PREEMPTION UNIT) (1 PC FOR THE CONFIRMATION LIGHT)	2340	FT
	OUTDOOR RATED CAT5 CABLE (TO VIDEO DETECTION CAMERAS) (NOT A BID ITEM) (INCIDENTAL TO VIDEO DETECTION SYSTEM)	1530	FT
	OUTDOOR RATED CAT5 CABLE (TO SURVEILLANCE CAMERA) (NOT A BID ITEM) (INCIDENTAL TO SURVEILLANCE CAMERA)	360	FT



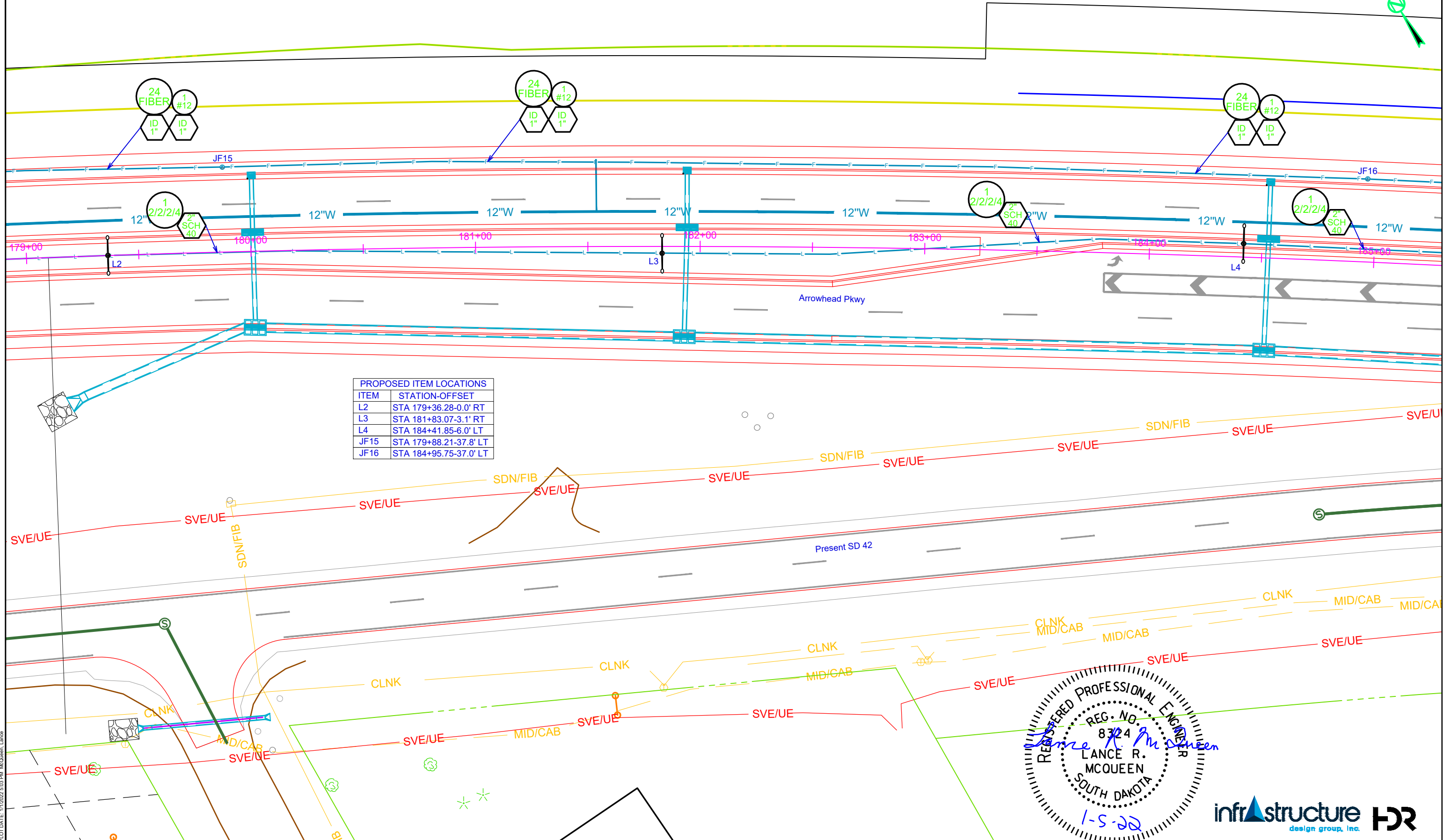
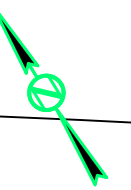
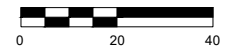
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Conduit Layout

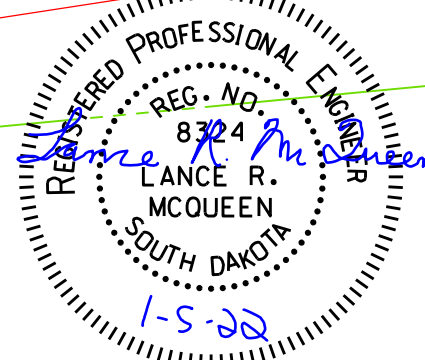
Arrowhead Pkwy

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L27	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L2	STA 179+36.28-0.0' RT
L3	STA 181+83.07-3.1' RT
L4	STA 184+41.85-6.0' LT
JF15	STA 179+88.21-37.8' LT
JF16	STA 184+95.75-37.0' LT



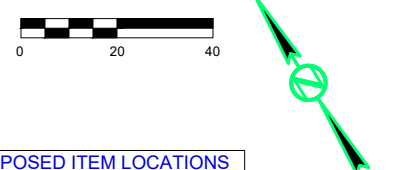
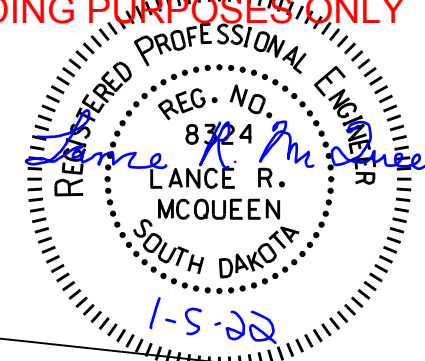
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 11/20/22 10:30 AM MCOUEN.LANCE

Conduit Layout

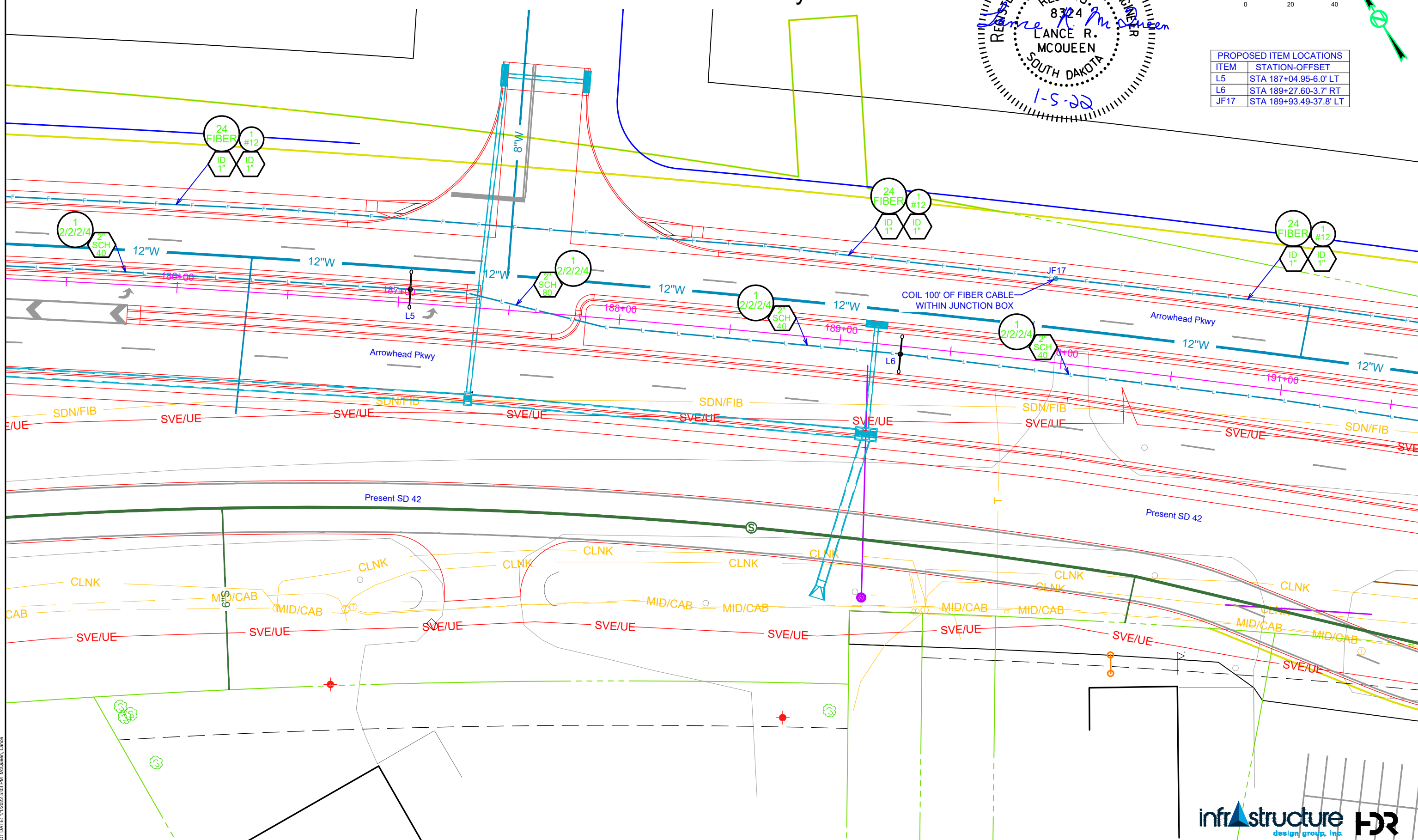
Arrowhead Pkwy

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L28	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L5	STA 187+04.95-6.0' LT
L6	STA 189+27.60-3.7' RT
JF17	STA 189+93.49-37.8' LT



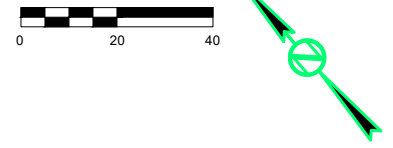
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1/17/2022 10:37 AM M. McQueen, Linc

Conduit Layout

Arrowhead Pkwy

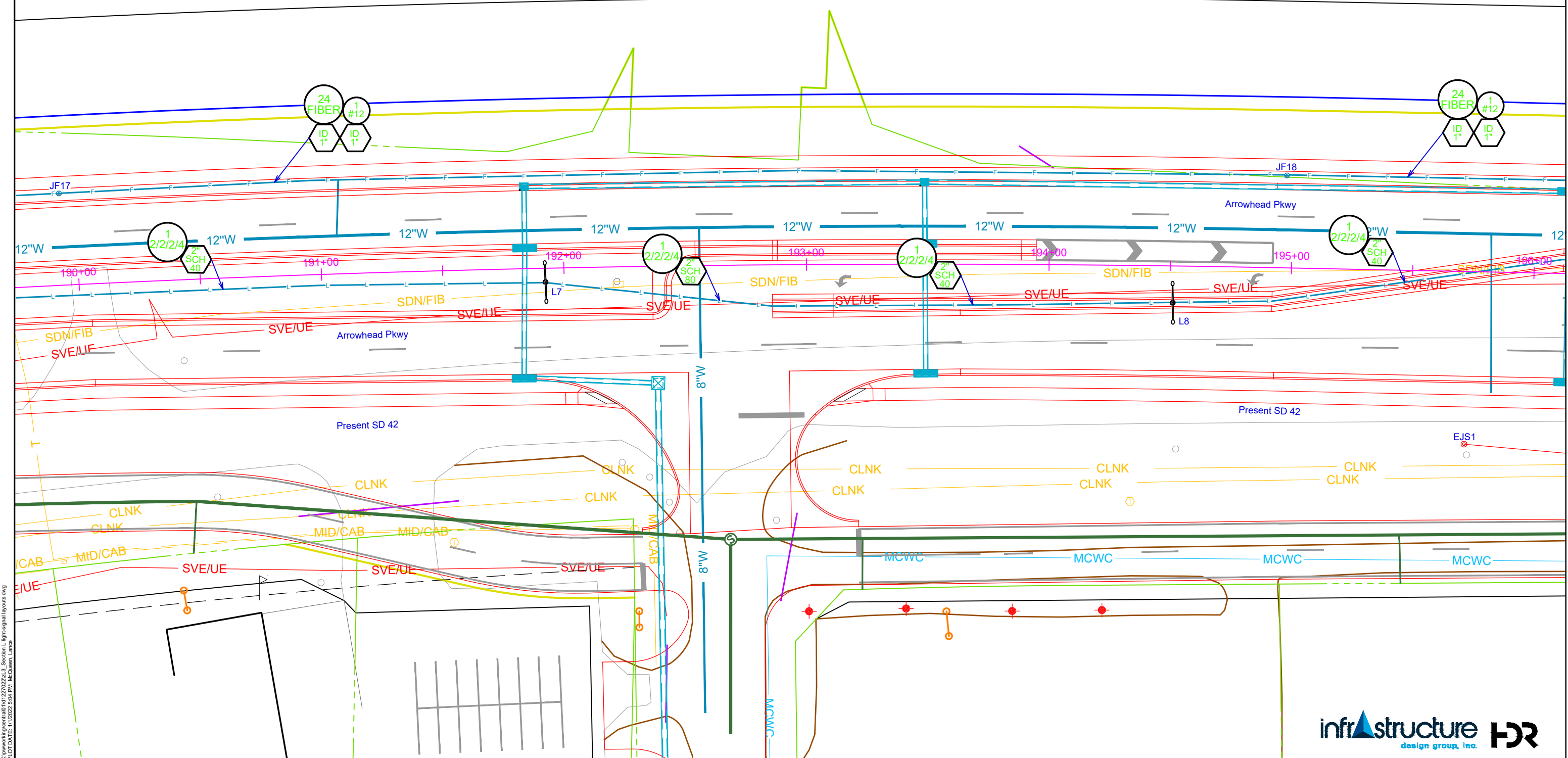
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L29	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L7	STA 191+92.30-5.7' RT
L8	STA 194+51.24-15.2' RT
JF18	STA 194+97.42-38.1' LT

REMOVAL ITEMS
EJS1



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 1/17/2022 10:54 PM Lance R. McQueen, L.P.E.

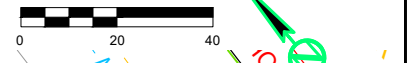
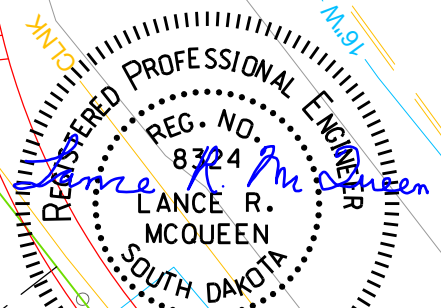
Conduit Layout

Arrowhead Pkwy

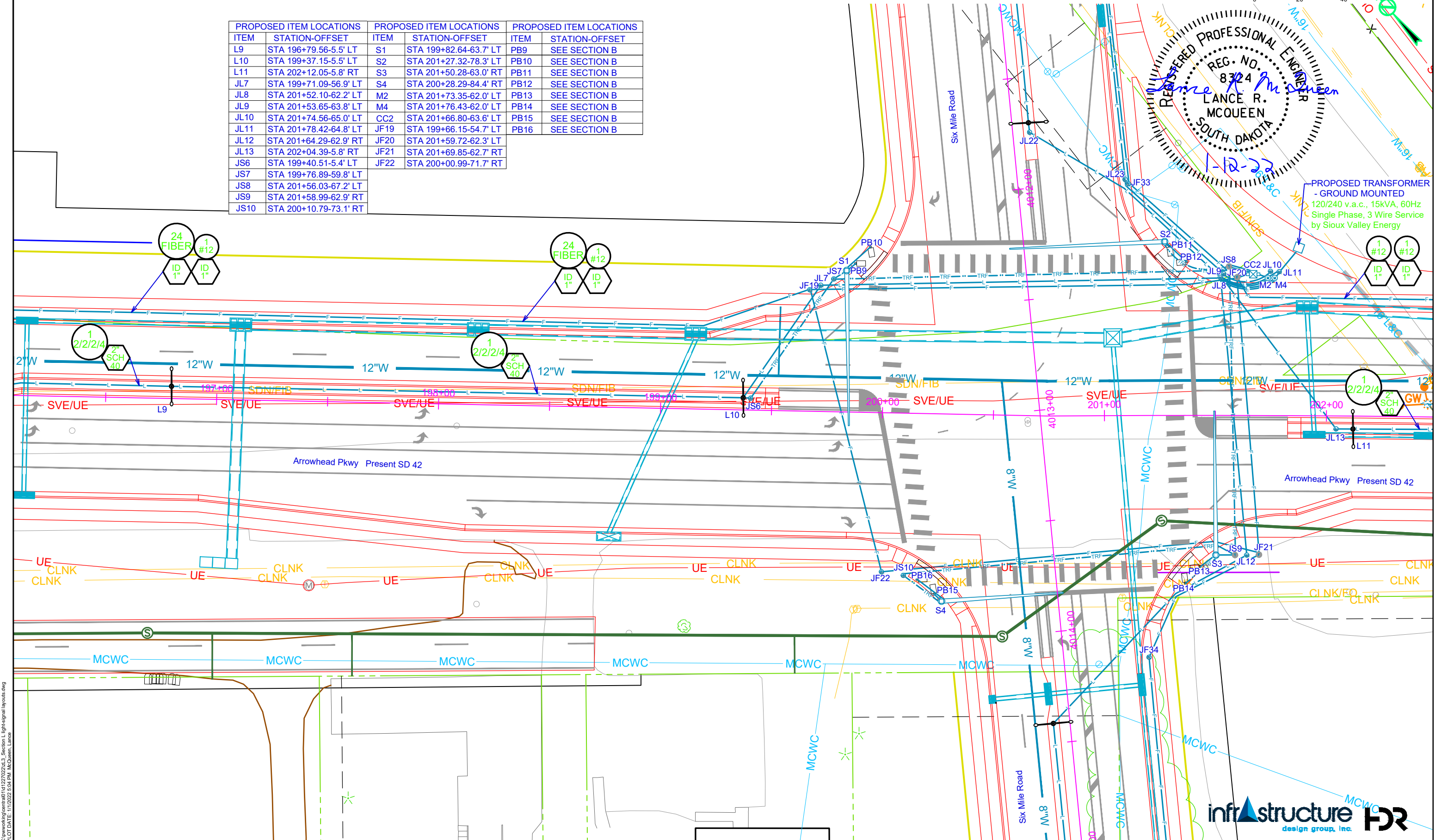
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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L30	TOTAL SHEETS L60
REV DATE: 1/12/2022		INITIAL: LRM	

PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET	ITEM	STATION-OFFSET
L9	STA 196+79.56-5.5' LT	S1	STA 199+82.64-63.7' LT	PB9	SEE SECTION B
L10	STA 199+37.15-5.5' LT	S2	STA 201+27.32-78.3' LT	PB10	SEE SECTION B
L11	STA 202+12.05-5.8' RT	S3	STA 201+50.28-63.0' RT	PB11	SEE SECTION B
JL7	STA 199+71.09-56.9' RT	S4	STA 200+28.29-84.4' RT	PB12	SEE SECTION B
JL8	STA 201+52.10-62.2' LT	M2	STA 201+73.35-62.0' LT	PB13	SEE SECTION B
JL9	STA 201+53.65-63.8' LT	M4	STA 201+76.43-62.0' LT	PB14	SEE SECTION B
JL10	STA 201+74.56-65.0' LT	CC2	STA 201+66.80-63.6' LT	PB15	SEE SECTION B
JL11	STA 201+78.42-64.8' LT	JF19	STA 199+66.15-54.7' LT	PB16	SEE SECTION B
JL12	STA 201+64.29-62.9' RT	JF20	STA 201+59.72-62.3' LT		
JL13	STA 202+04.39-5.8' RT	JF21	STA 201+69.85-62.7' RT		
JS6	STA 199+40.51-5.4' LT	JF22	STA 200+00.99-71.7' RT		
JS7	STA 199+76.89-59.8' LT				
JS8	STA 201+56.03-67.2' LT				
JS9	STA 201+58.99-62.9' RT				
JS10	STA 200+10.79-73.1' RT				



PROPOSED TRANSFORMER
- GROUND MOUNTED
120/240 v.a.c., 15kVA, 60Hz
Single Phase, 3 Wire Service
by Sioux Valley Energy

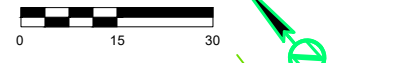
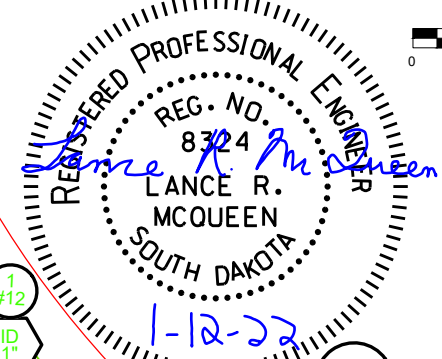


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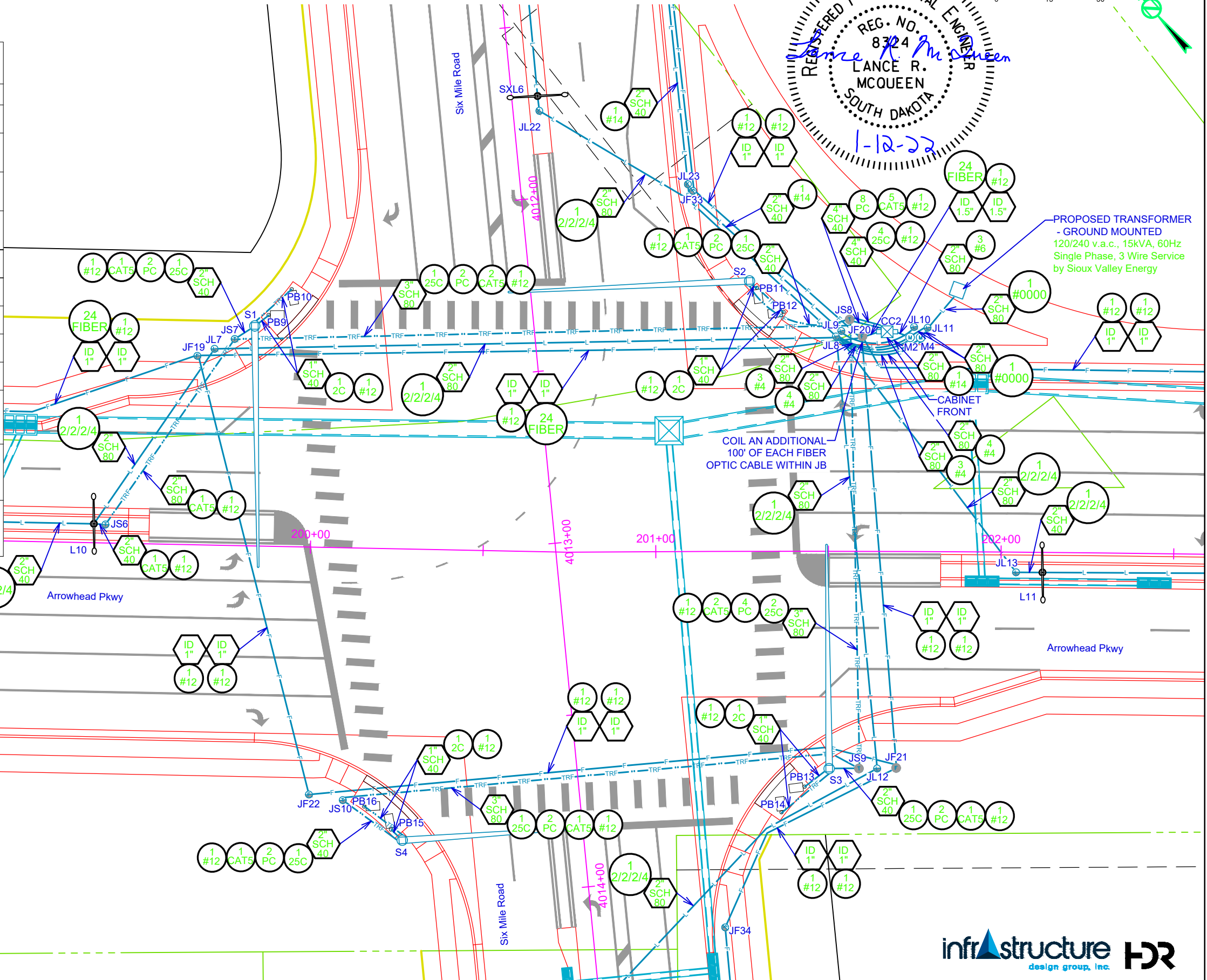
Signal Conduit Layout FOR BIDDING PURPOSES ONLY

Arrowhead Pkwy & Six Mile Road

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L31	TOTAL SHEETS L60
REV DATE: 1/12/2022		INITIAL: LRM	



ESTIMATE OF QUANTITIES P 1358(02) - PCN 05C2			
KEY	ITEM	QUANTITY	UNIT
	TRAFFIC SIGNAL CONTROLLER (FRONT OF CABINET / DOOR)	1	EACH
	SIDE MOUNTED CABINET (FOR BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
	BATTERY BACKUP SYSTEM FOR TRAFFIC SIGNAL (INSTALLED WITHIN SIDE MOUNTED CABINET) (INSTALLED ON RIGHT SIDE OF CABINET FRONT)	1	EACH
	SIDE MOUNTED CABINET (FOR FIBER OPTIC CABLE) (INSTALLED ON LEFT SIDE OF CABINET FRONT)	1	EACH
	2/C #14 AWG IMSA COPPER CABLE, K1 (TO PEDESTRIAN PUSH BUTTON)	340	FT
	3/C #14 AWG IMSA COPPER CABLE, K1 (TO PEDESTRIAN SIGNAL HEADS)	120	FT
	5/C #14 AWG IMSA COPPER CABLE, K1 (TO 3 SECTION SIGNAL HEADS)	630	FT
	7/C #14 AWG IMSA COPPER CABLE, K1 (TO 4 SECTION AND 5 SECTION SIGNAL HEADS)	495	FT
	25/C #14 AWG IMSA COPPER CABLE, K1 (TO SIGNAL BASES)	1000	FT
	PREEMPTION CABLE (TO OPTICAL DETECTORS) (1 PC FOR THE PREEMPTION UNIT) (1 PC FOR THE CONFIRMATION LIGHT)	2570	FT
	OUTDOOR RATED CAT5 CABLE (TO VIDEO DETECTION CAMERAS) (NOT A BID ITEM) (INCIDENTAL TO VIDEO DETECTION SYSTEM)	1610	FT
	OUTDOOR RATED CAT5 CABLE (TO SURVEILLANCE CAMERA) (NOT A BID ITEM) (INCIDENTAL TO SURVEILLANCE CAMERA)	325	FT



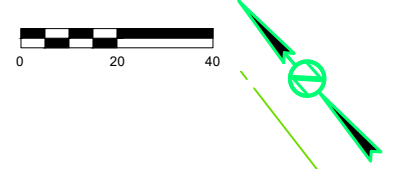
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Conduit Layout

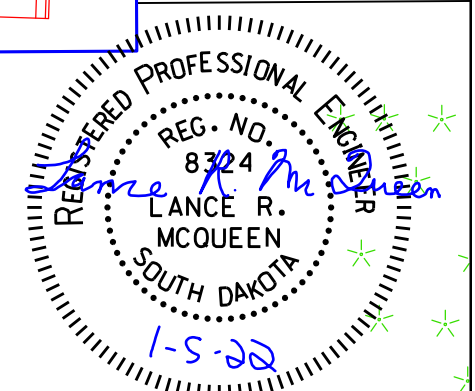
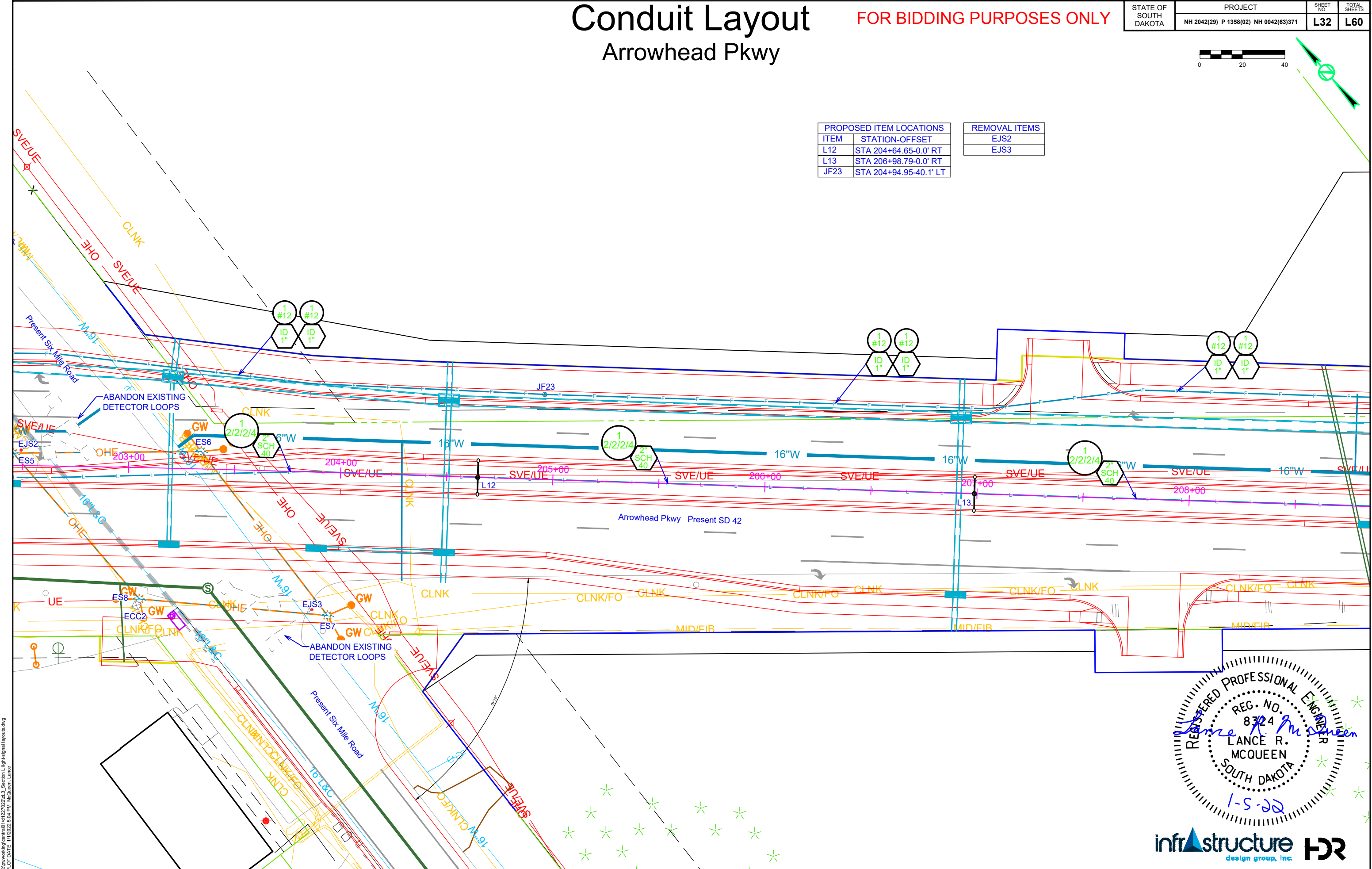
Arrowhead Pkwy

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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L32	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS		REMOVAL ITEMS	
ITEM	STATION-OFFSET		
L12	STA 204+64.65-0.0' RT	EJS2	
L13	STA 206+98.79-0.0' RT	EJS3	
JF23	STA 204+94.95-40.1' LT		



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Conduit Layout

Arrowhead Pkwy

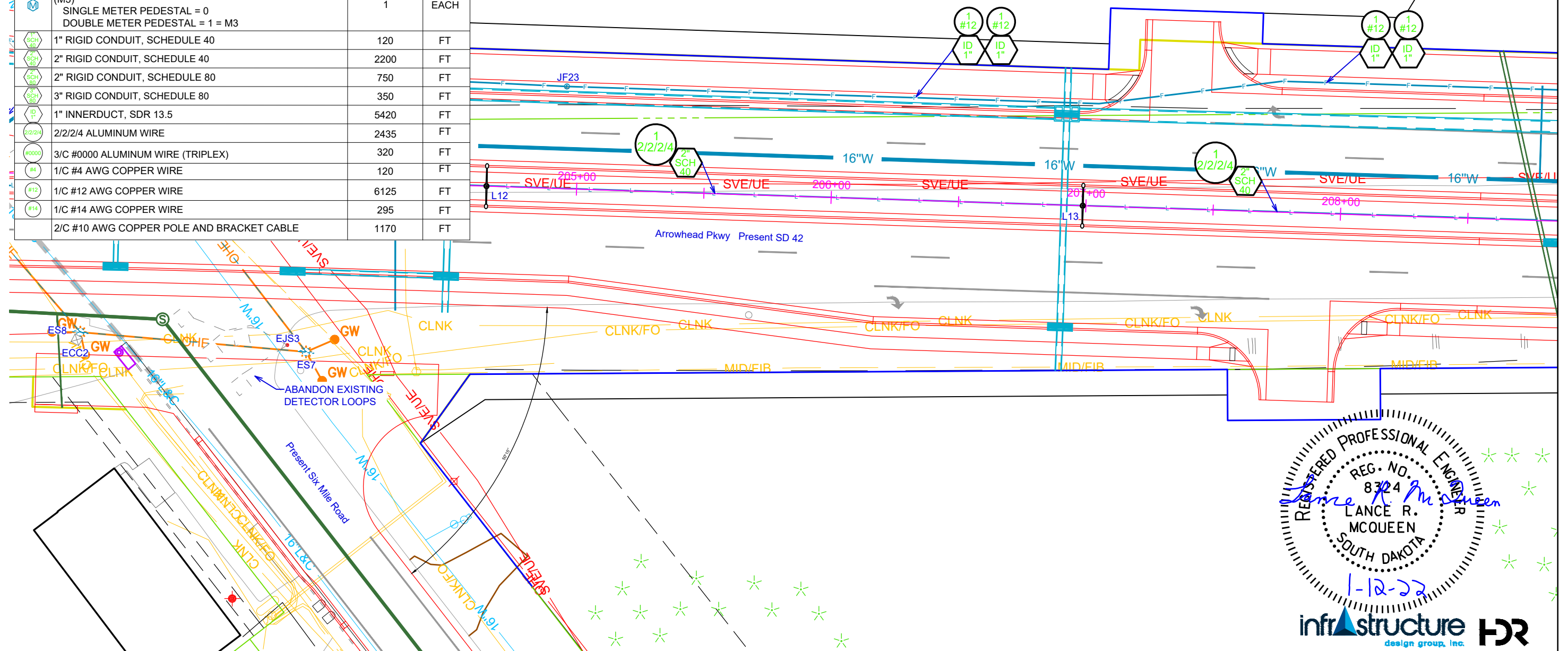
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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L33	TOTAL SHEETS L60
REV DATE: 1/12/2022		INITIAL: LRM	



ESTIMATE OF QUANTITIES NH 0042(63)371 - PCN 05C6			
KEY	ITEM	QUANTITY	UNIT
○	BREAKAWAY BASE LUMINAIRE POLE, 50' MOUNTING HEIGHT W/ TWIN 8' ARMS (L11-L19)	9	EACH
○	ROADWAY LUMINAIRE, LED WITH PHOTOELECTRIC CELL (L11-L19)	18	EACH
○	2' DIAMETER FOOTING (L11-L19)	81.0	FT
○	12" DIAMETER ELECTRICAL JUNCTION BOX (JS13, JS14, JS16, JS17, JS19)	5	EACH
○	24" DIAMETER ELECTRICAL JUNCTION BOX (JL13-JL19, JS11, JS12, JS20, JF23, JF24, JF26, JF27, JF30)	15	EACH
○	30" DIAMETER ELECTRICAL JUNCTION BOX (JS15, JS18, JF25, JF28, JF29)	5	EACH
M	ELECTRICAL SERVICE CABINET (M3) SINGLE METER PEDESTAL = 0 DOUBLE METER PEDESTAL = 1 = M3	1	EACH
SCH 40	1" RIGID CONDUIT, SCHEDULE 40	120	FT
SCH 40	2" RIGID CONDUIT, SCHEDULE 40	2200	FT
SCH 80	2" RIGID CONDUIT, SCHEDULE 80	750	FT
SCH 80	3" RIGID CONDUIT, SCHEDULE 80	350	FT
ID	1" INNERDUCT, SDR 13.5	5420	FT
2/2/2/4	2/2/2/4 ALUMINUM WIRE	2435	FT
#0000	3/C #0000 ALUMINUM WIRE (TRIPLEX)	320	FT
#4	1/C #4 AWG COPPER WIRE	120	FT
#12	1/C #12 AWG COPPER WIRE	6125	FT
#14	1/C #14 AWG COPPER WIRE	295	FT
	2/C #10 AWG COPPER POLE AND BRACKET CABLE	1170	FT

REMOVAL ITEMS NH 0042(63)371 - PCN 05C6			
KEY	ITEM	QUANTITY	UNIT
●	REMOVE EXISTING ELECTRICAL JUNCTION BOX (EJS2, EJS3)	LUMP SUM*	LS
*INCLUDED IN THE BID ITEM "MISCELLANEOUS, ELECTRICAL"			



REGISTERED PROFESSIONAL ENGINEER

REG. NO. 8324

Lance R. McQueen

LANCE R. MCQUEEN

SOUTH DAKOTA

1-12-22

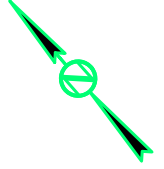
infrastructure design group, inc. HDR

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Conduit Layout Arrowhead Pkwy

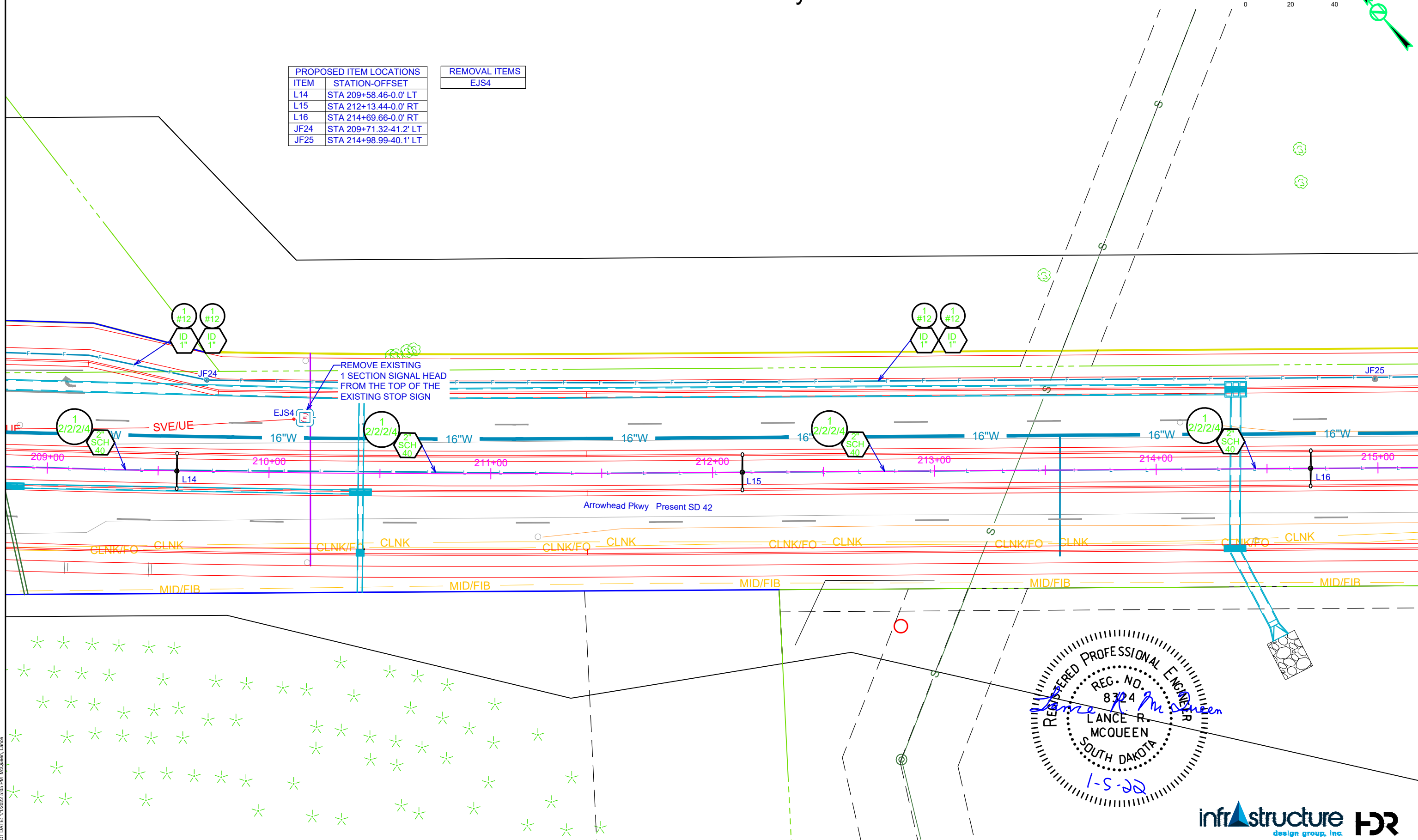
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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L34	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L14	STA 209+58.46-0.0' LT
L15	STA 212+13.44-0.0' RT
L16	STA 214+69.66-0.0' RT
JF24	STA 209+71.32-41.2' LT
JF25	STA 214+98.99-40.1' LT

REMOVAL ITEMS	
ITEM	DESCRIPTION
EJS4	REMOVE EXISTING 1 SECTION SIGNAL HEAD FROM THE TOP OF THE EXISTING STOP SIGN



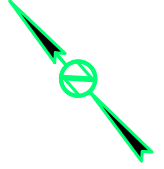
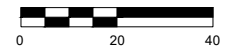
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Conduit Layout

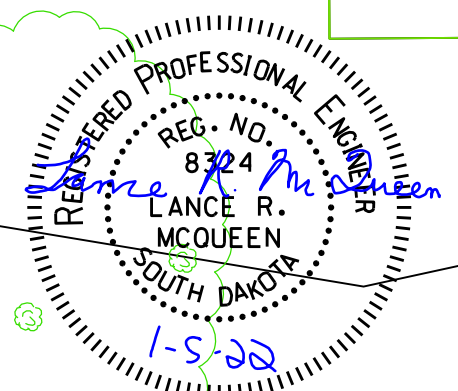
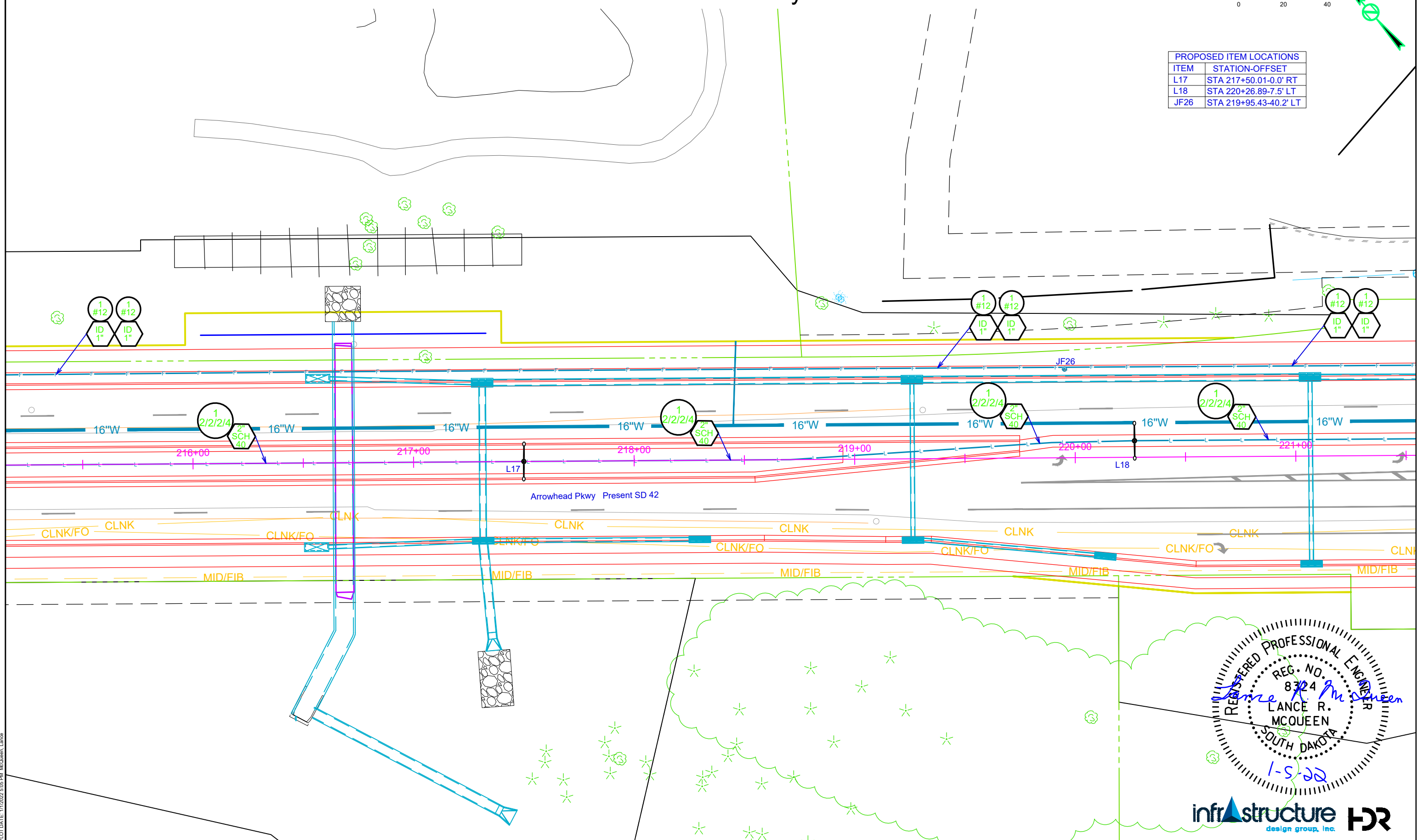
Arrowhead Pkwy

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STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L35	L60



PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
L17	STA 217+50.01-0.0' RT
L18	STA 220+26.89-7.5' LT
JF26	STA 219+95.43-40.2' LT



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Conduit Layout Arrowhead Pkwy

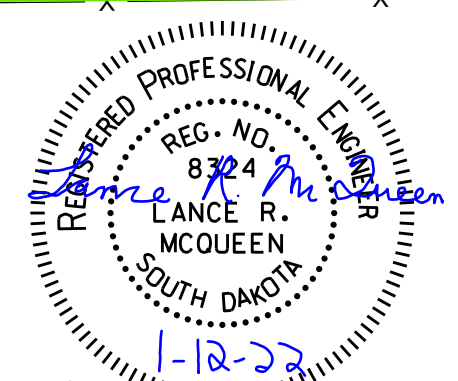
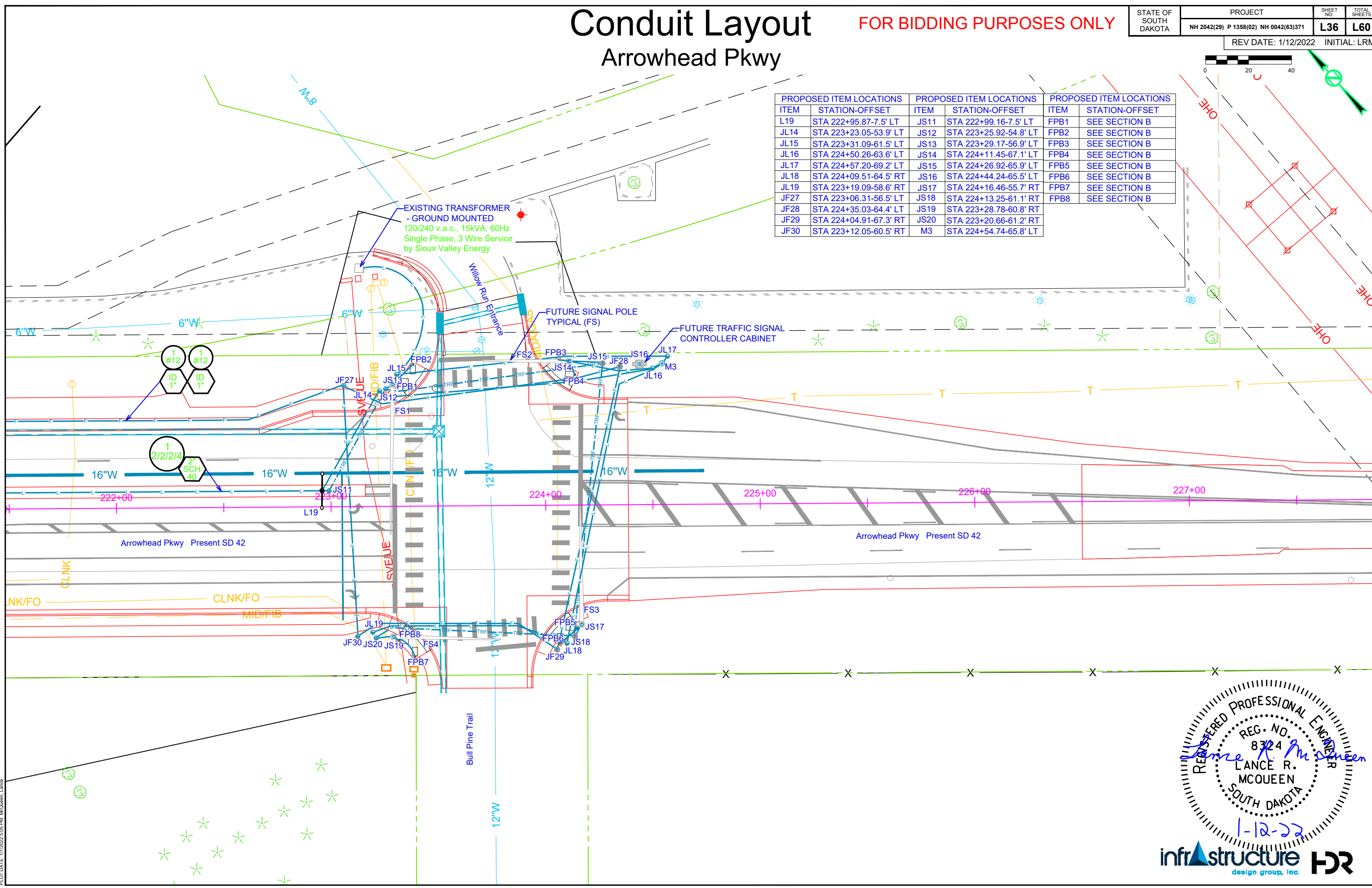
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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L36	TOTAL SHEETS L60
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REV DATE: 1/12/2022 INITIAL: LRM



PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS		PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET	ITEM	STATION-OFFSET	ITEM	STATION-OFFSET
L19	STA 222+95.87-7.5' LT	JS11	STA 222+99.16-7.5' LT	FPB1	SEE SECTION B
JL14	STA 223+23.05-53.9' LT	JS12	STA 223+25.92-54.8' LT	FPB2	SEE SECTION B
JL15	STA 223+31.09-61.5' LT	JS13	STA 223+29.17-56.9' LT	FPB3	SEE SECTION B
JL16	STA 224+50.26-63.6' LT	JS14	STA 224+11.45-67.1' LT	FPB4	SEE SECTION B
JL17	STA 224+57.20-69.2' LT	JS15	STA 224+26.92-65.9' LT	FPB5	SEE SECTION B
JL18	STA 224+09.51-64.5' RT	JS16	STA 224+44.24-65.5' LT	FPB6	SEE SECTION B
JL19	STA 223+19.09-58.6' RT	JS17	STA 224+16.46-55.7' RT	FPB7	SEE SECTION B
JF27	STA 223+06.31-56.5' LT	JS18	STA 224+13.25-61.1' RT	FPB8	SEE SECTION B
JF28	STA 224+35.03-64.4' LT	JS19	STA 223+28.78-60.8' RT		
JF29	STA 224+04.91-67.3' RT	JS20	STA 223+20.66-61.2' RT		
JF30	STA 223+12.05-60.5' RT	M3	STA 224+54.74-65.8' LT		

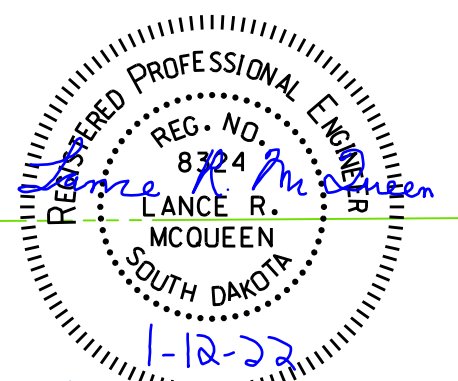
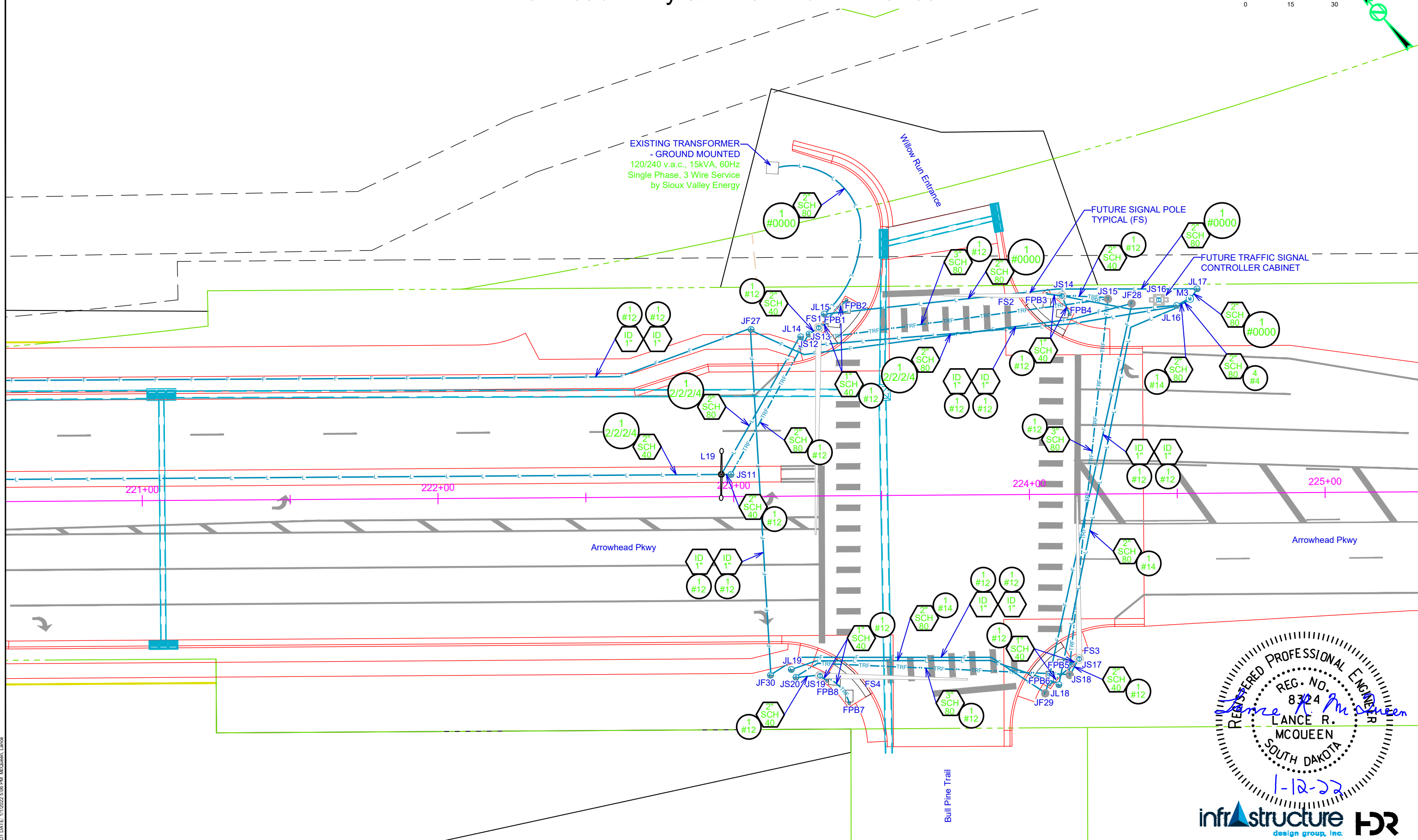
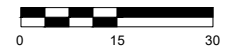


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Signal Conduit Layout FOR BIDDING PURPOSES ONLY

Arrowhead Pkwy & Willow Run Entrance

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L37	L60
REV DATE: 1/12/2022		INITIAL: LRM	

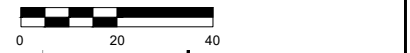


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Conduit Layout Six Mile Road

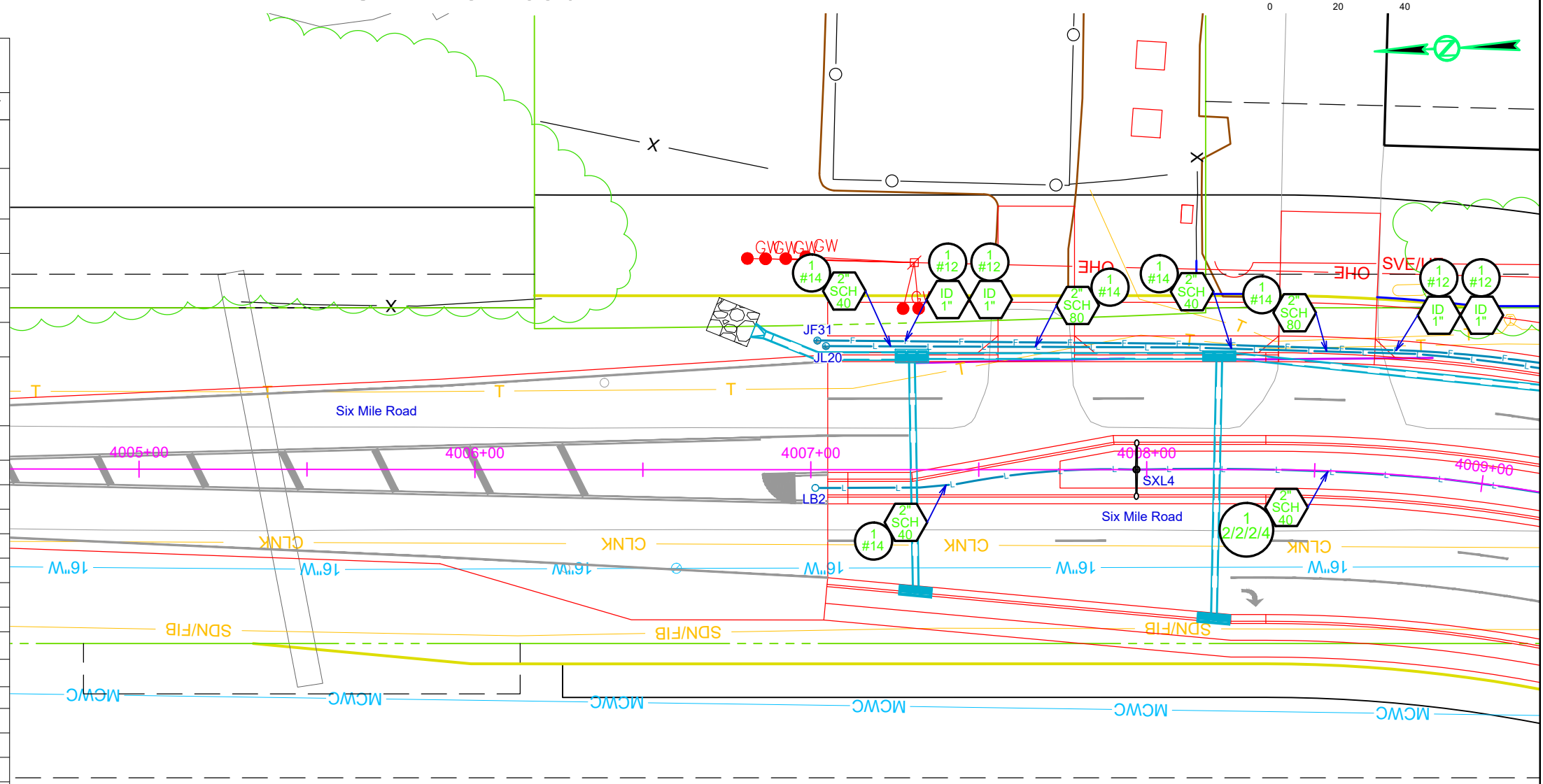
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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L38	TOTAL SHEETS L60
REV DATE: 1/12/2022		INITIAL: LRM	

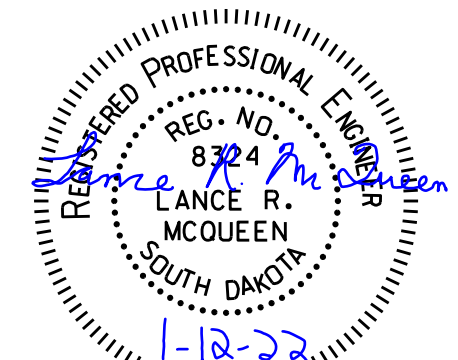


ESTIMATE OF QUANTITIES P 1358(02) - PCN 05C2

KEY	ITEM	QUANTITY	UNIT
○	BREAKAWAY BASE LUMINAIRE POLE, 40' MOUNTING HEIGHT W/ 8' ARM (SXL11-SXL15)	5	EACH
○	BREAKAWAY BASE LUMINAIRE POLE, 40' MOUNTING HEIGHT W/ TWIN 8' ARMS (SXL4-SXL10)	7	EACH
○	ROADWAY LUMINAIRE, LED WITH PHOTOELECTRIC CELL (SXL4-SXL15)	19	EACH
○	2' DIAMETER FOOTING (SXL4-SXL15)	96.0	FT
○	24" DIAMETER ELECTRICAL JUNCTION BOX (JL7-12, JL20-24, JS6, JS7, JS10, JF19, JF22, JF31-JF35, JF37, JF38)	23	EACH
○	30" DIAMETER ELECTRICAL JUNCTION BOX (JS8, JS9, JF20, JF21, JF36)	5	EACH
Ⓜ	ELECTRICAL SERVICE CABINET (M2, M4) SINGLE METER PEDESTAL = 1 = M2 DOUBLE METER PEDESTAL = 1 = M4	2	EACH
○	LOCATOR BALL (LB2)	1	EACH
○	1" RIGID CONDUIT, SCHEDULE 40	180	FT
○	2" RIGID CONDUIT, SCHEDULE 40	2295	FT
○	4" RIGID CONDUIT, SCHEDULE 40	60	FT
○	2" RIGID CONDUIT, SCHEDULE 80	1370	FT
○	3" RIGID CONDUIT, SCHEDULE 80	490	FT
○	1" INNERDUCT, SDR 13.5	5240	FT
○	1.5" INNERDUCT, SDR 13.5	50	FT
○	2/2/2/4 ALUMINUM WIRE	2655	FT
○	3/C #0000 ALUMINUM WIRE (TRIPLEX)	110	FT
○	1/C #4 AWG COPPER WIRE	700	FT
○	1/C #6 AWG COPPER WIRE	150	FT
○	1/C #12 AWG COPPER WIRE	6400	FT
○	1/C #14 AWG COPPER WIRE	765	FT
○	2/C #10 AWG COPPER POLE AND BRACKET CABLE	1045	FT
○	24 STRAND FIBER OPTIC CABLE	400	FT



PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
SXL4	STA 4007+96.97-0.0' RT
LB2	STA 4007+01.39-5.5' RT
JL20	STA 4007+04.53-36.8' LT
JF31	STA 4007+01.98-38.5' LT



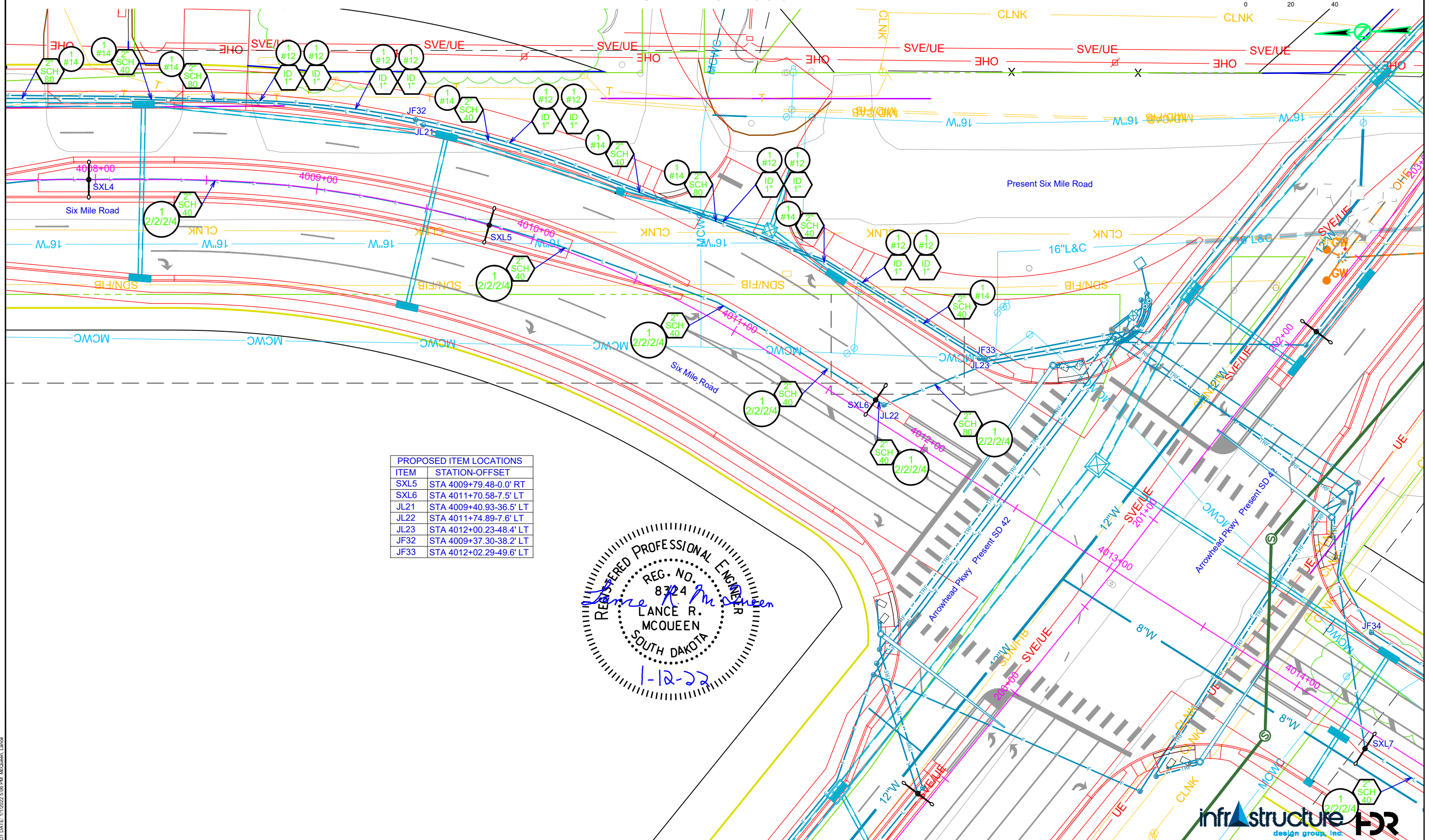
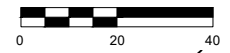
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Conduit Layout

Six Mile Road

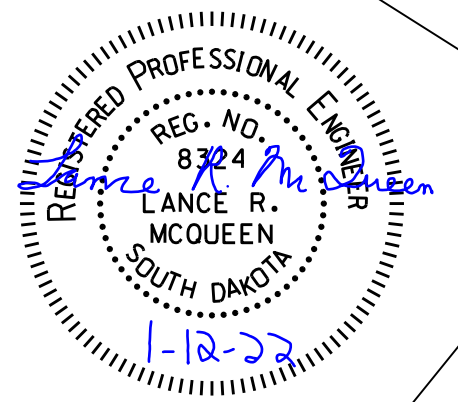
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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L39	TOTAL SHEETS L60
REV DATE: 1/12/2022		INITIAL: LRM	



PROPOSED ITEM LOCATIONS

ITEM	STATION-OFFSET
SXL5	STA 4009+79.48-0.0' RT
SXL6	STA 4011+70.58-7.5' LT
JL21	STA 4009+40.93-36.5' LT
JL22	STA 4011+74.89-7.6' LT
JL23	STA 4012+00.23-48.4' LT
JF32	STA 4009+37.30-38.2' LT
JF33	STA 4012+02.29-49.6' LT

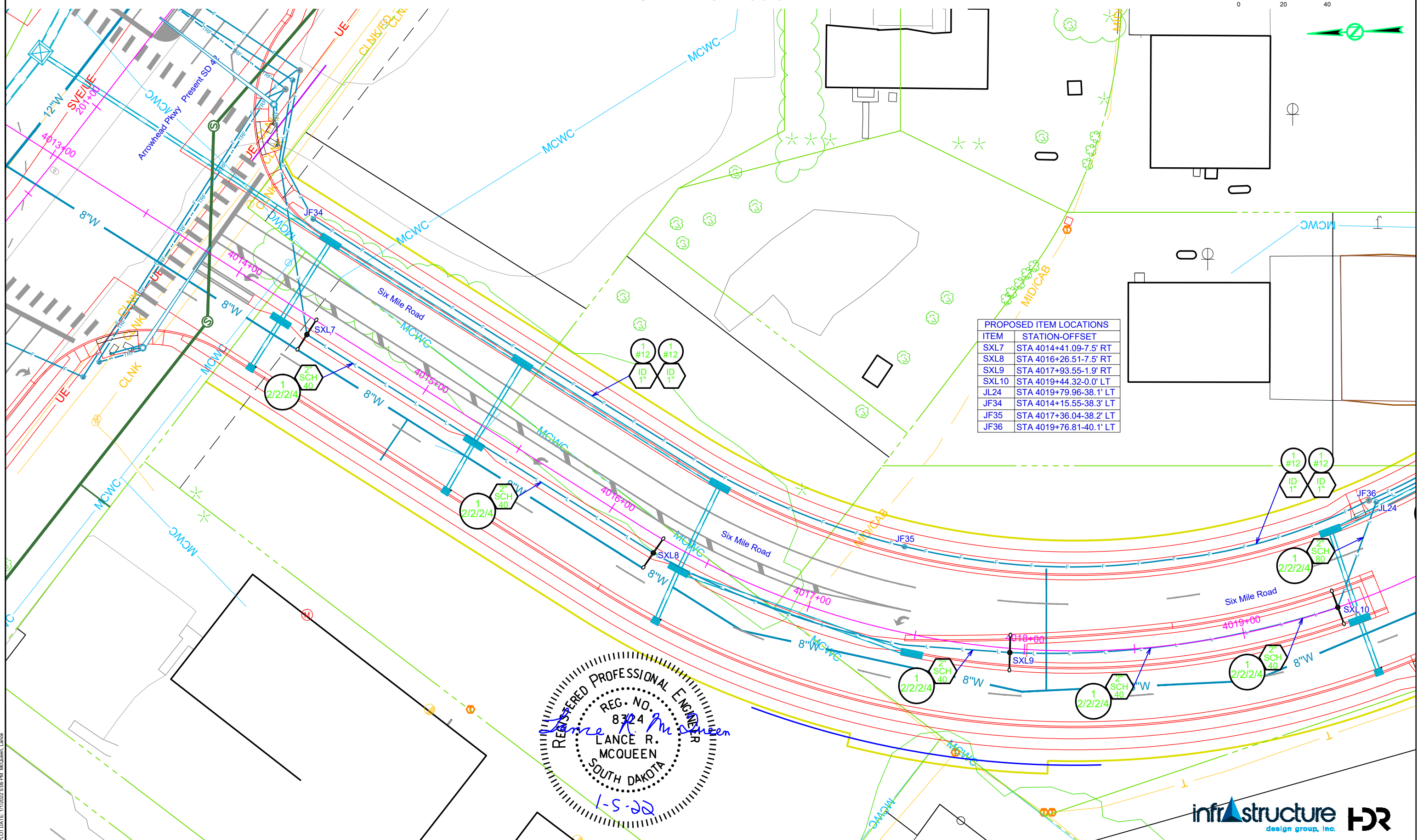
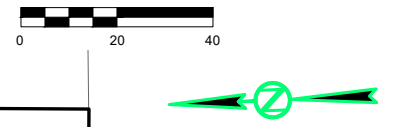


Conduit Layout

Six Mile Road

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STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L40	L60



ITEM	STATION-OFFSET
SXL7	STA 4014+41.09-7.5' RT
SXL8	STA 4016+26.51-7.5' RT
SXL9	STA 4017+93.55-1.9' RT
SXL10	STA 4019+44.32-0.0' LT
JL24	STA 4019+79.96-38.1' LT
JF34	STA 4014+15.55-38.3' LT
JF35	STA 4017+36.04-38.2' LT
JF36	STA 4019+76.81-40.1' LT

REGISTERED PROFESSIONAL ENGINEER
 REG. NO. 8324
Lance R. McQueen
 LANCE R. MCOQUEEN
 SOUTH DAKOTA
 1-5-22

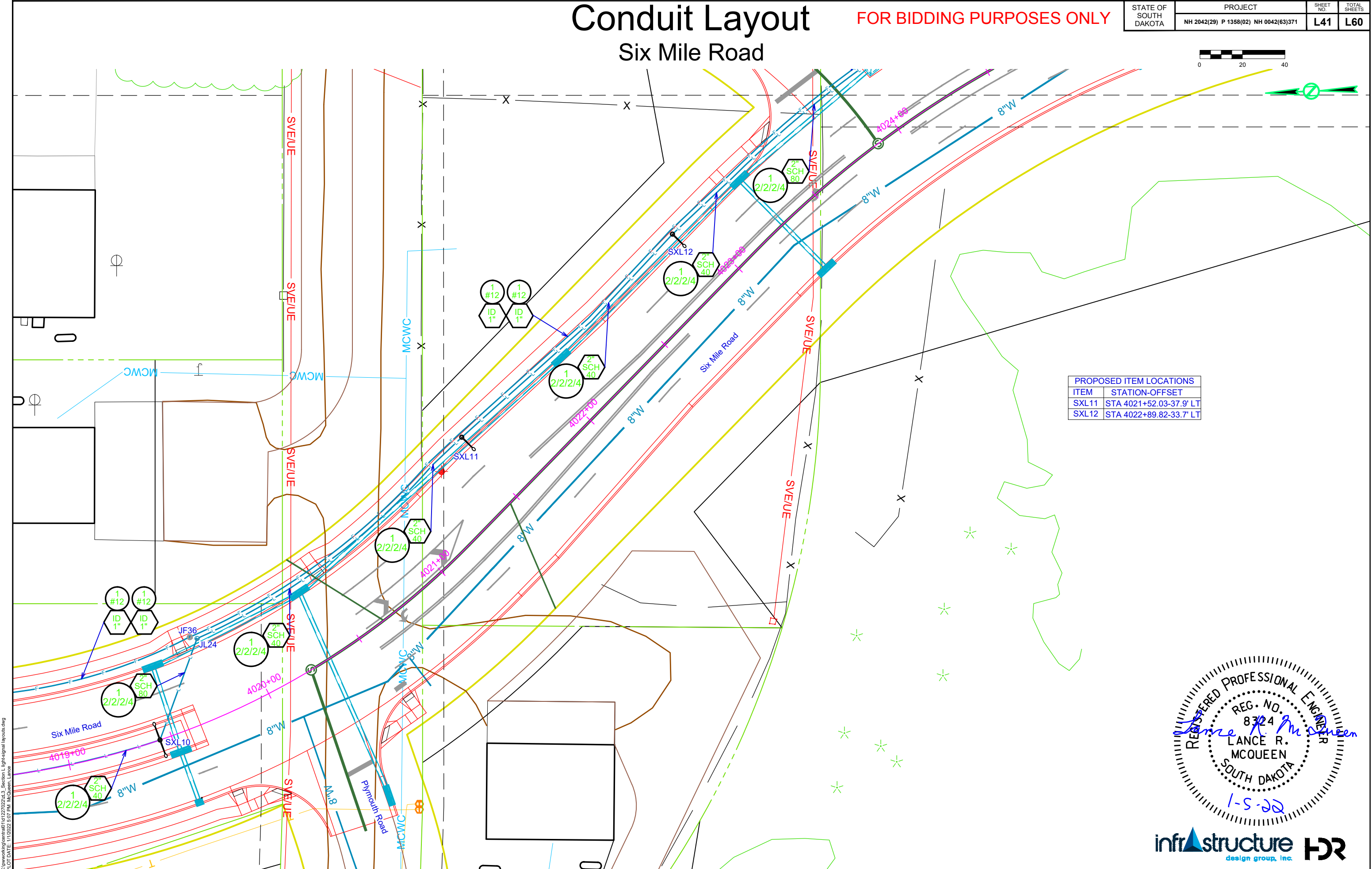
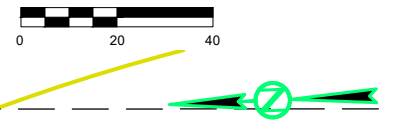
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Conduit Layout

Six Mile Road

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STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L41	TOTAL SHEETS L60
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PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
SXL11	STA 4021+52.03-37.9' LT
SXL12	STA 4022+89.82-33.7' LT



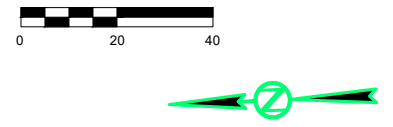
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 1/17/2022 10:27 AM MCMQUEEN, LANCE

Conduit Layout

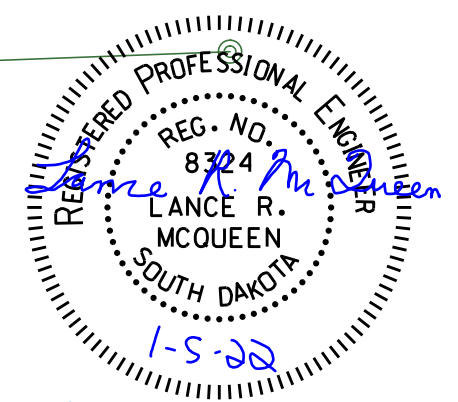
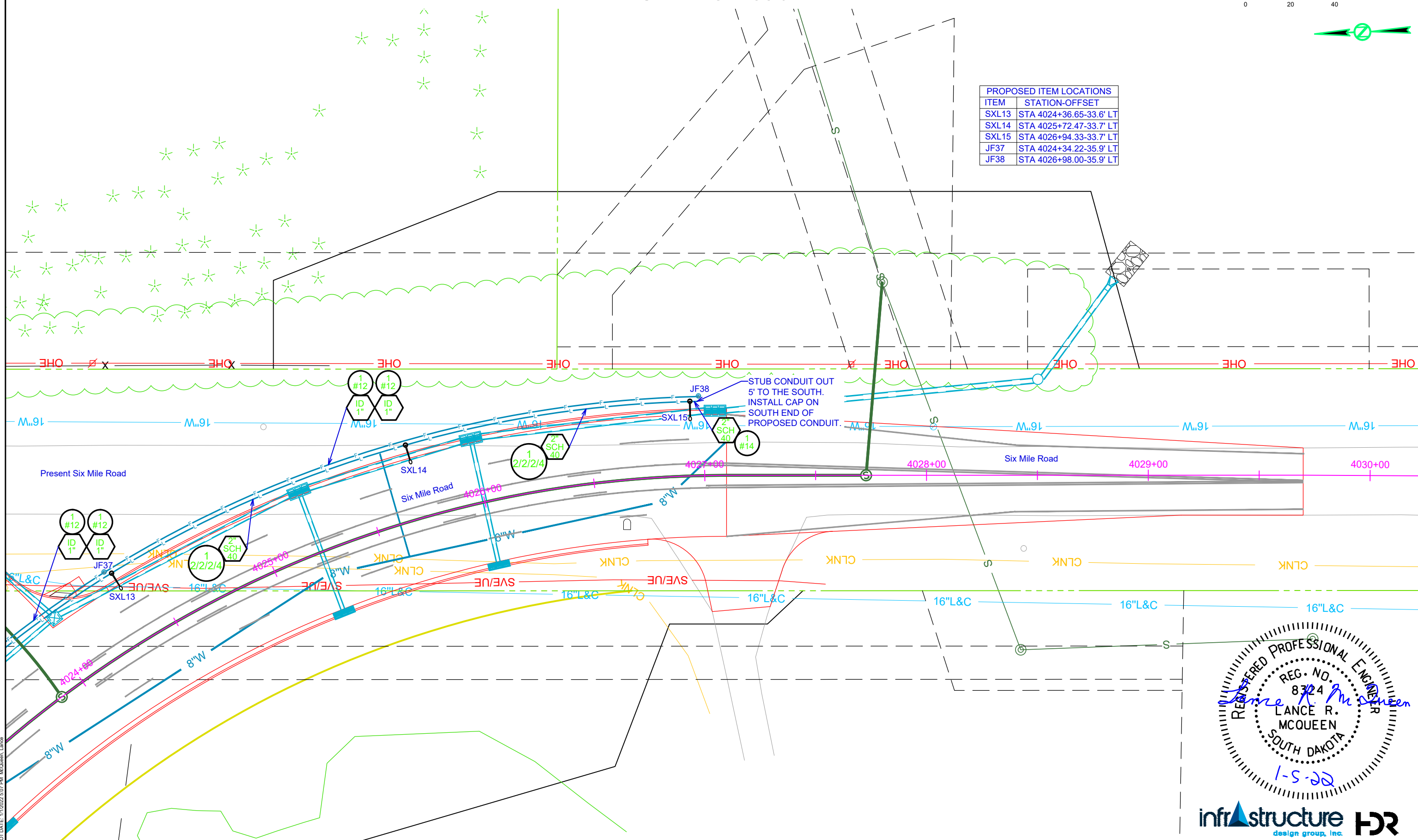
Six Mile Road

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L42	TOTAL SHEETS L60
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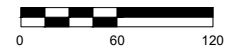
PROPOSED ITEM LOCATIONS	
ITEM	STATION-OFFSET
SXL13	STA 4024+36.65-33.6' LT
SXL14	STA 4025+72.47-33.7' LT
SXL15	STA 4026+94.33-33.7' LT
JF37	STA 4024+34.22-35.9' LT
JF38	STA 4026+98.00-35.9' LT



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 1/17/2022 10:17 AM M. McQueen, Linc

Video Detection Layout

Arrowhead Pkwy & Six Mile Road

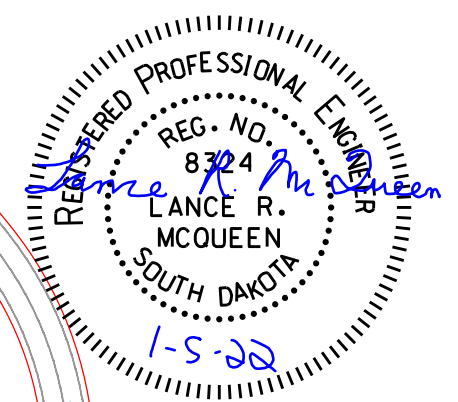
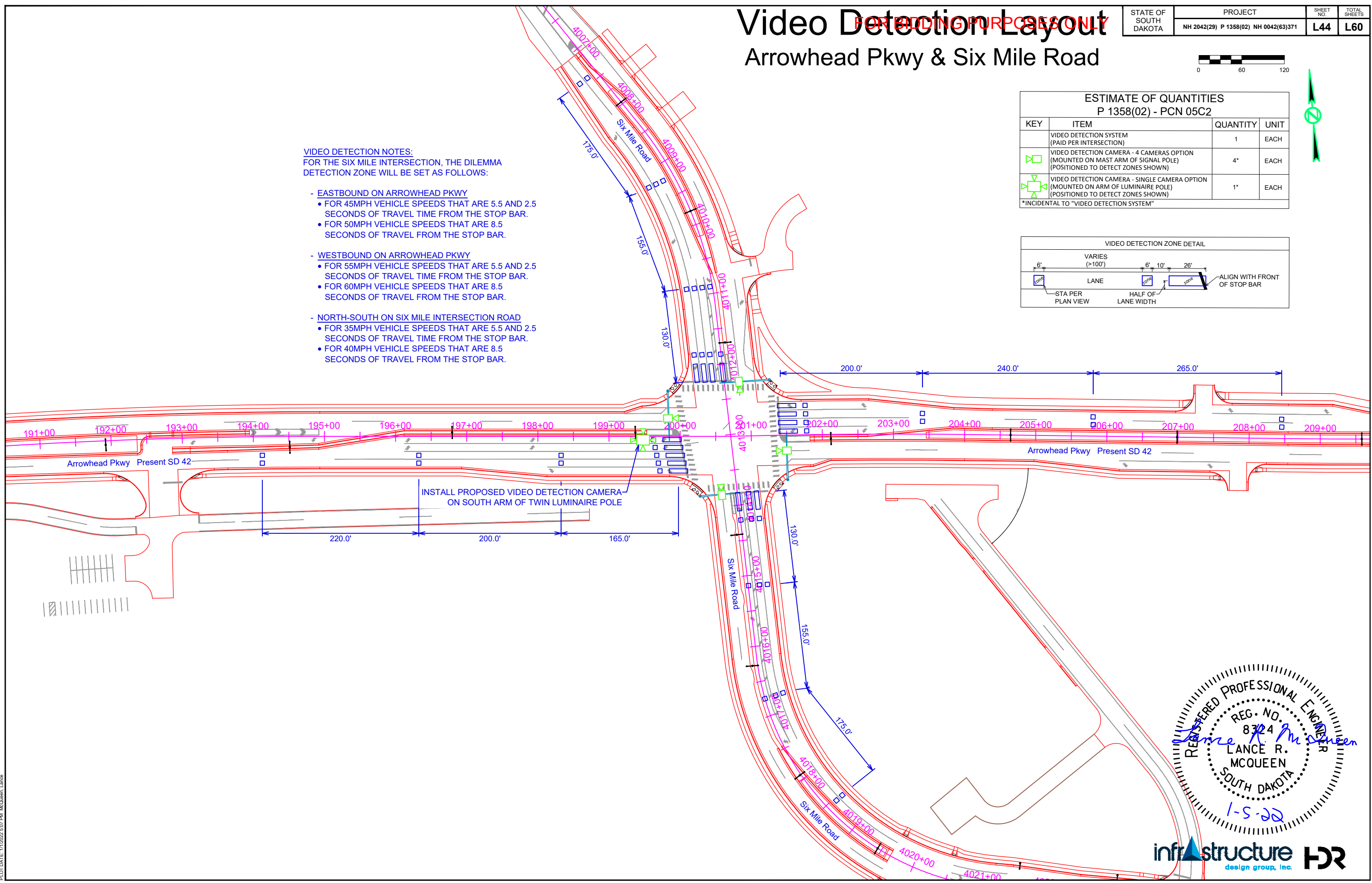
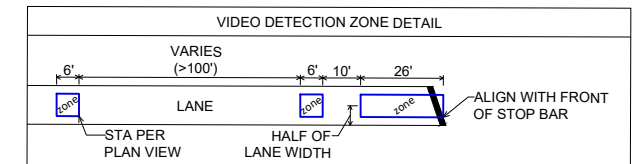


ESTIMATE OF QUANTITIES			
P 1358(02) - PCN 05C2			
KEY	ITEM	QUANTITY	UNIT
	VIDEO DETECTION SYSTEM (PAID PER INTERSECTION)	1	EACH
	VIDEO DETECTION CAMERA - 4 CAMERAS OPTION (MOUNTED ON MAST ARM OF SIGNAL POLE) (POSITIONED TO DETECT ZONES SHOWN)	4*	EACH
	VIDEO DETECTION CAMERA - SINGLE CAMERA OPTION (MOUNTED ON ARM OF LUMINAIRE POLE) (POSITIONED TO DETECT ZONES SHOWN)	1*	EACH

*INCIDENTAL TO "VIDEO DETECTION SYSTEM"

VIDEO DETECTION NOTES:
FOR THE SIX MILE INTERSECTION, THE DILEMMA DETECTION ZONE WILL BE SET AS FOLLOWS:

- **EASTBOUND ON ARROWHEAD PKWY**
 - FOR 45MPH VEHICLE SPEEDS THAT ARE 5.5 AND 2.5 SECONDS OF TRAVEL TIME FROM THE STOP BAR.
 - FOR 50MPH VEHICLE SPEEDS THAT ARE 8.5 SECONDS OF TRAVEL FROM THE STOP BAR.
- **WESTBOUND ON ARROWHEAD PKWY**
 - FOR 55MPH VEHICLE SPEEDS THAT ARE 5.5 AND 2.5 SECONDS OF TRAVEL TIME FROM THE STOP BAR.
 - FOR 60MPH VEHICLE SPEEDS THAT ARE 8.5 SECONDS OF TRAVEL FROM THE STOP BAR.
- **NORTH-SOUTH ON SIX MILE INTERSECTION ROAD**
 - FOR 35MPH VEHICLE SPEEDS THAT ARE 5.5 AND 2.5 SECONDS OF TRAVEL TIME FROM THE STOP BAR.
 - FOR 40MPH VEHICLE SPEEDS THAT ARE 8.5 SECONDS OF TRAVEL FROM THE STOP BAR.



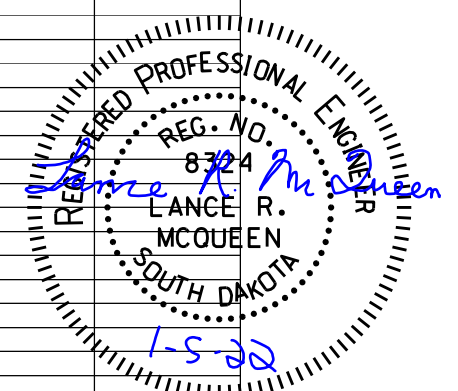
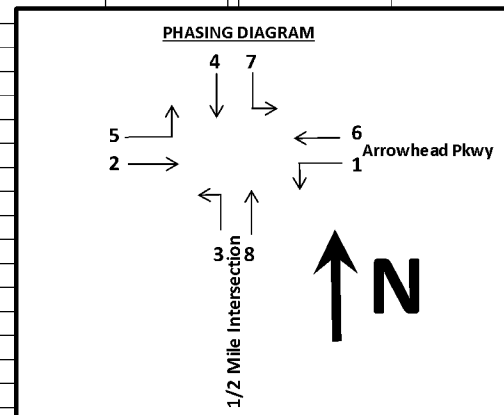
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DATE: 11/20/22 10:37 AM McQueen, Lance

Signal Wiring Diagram FOR BIDDING PURPOSES ONLY

1/2 Mile Intersection

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) P 1358(02) NH 0042(63)371	SHEET NO. L45	TOTAL SHEETS L60
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CORNER	S32 - Southeast			CORNER	S33-Southwest			CORNER	S30-Northwest			CORNER	S31-Northeast			
	Cable # or color	Controller	Terminal		Cable # or color	Controller	Terminal		Cable # or color	Controller	Terminal		Cable # or color	Controller	Terminal	
Phase # 2 Head No.	Wire Color	Head Color	Designation	Phase # 4 Head No.	Wire Color	Head Color	Designation	Phase # 6 Head No.	Wire Color	Head Color	Designation	Phase # 8 Head No.	Wire Color	Head Color	Designation	
11,12,13	Red	Red	2 R	16,17	Red	Red	4 R	2,3,4	Red	Red	6 R	7,8	Red	Red	8 R	
	Orange	Amber	2 Y		Orange	Amber	4 Y		Orange	Amber	6 Y		Orange	Amber	8 Y	
	Green	Green	2 G		Green	Green	4 G		Green	Green	6 G		Green	Green	8 G	
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB	
Phase # 2 Ped Head No.				Phase # 4 Ped Head No.				Phase # 6 Ped Head No.				Phase # 8 Ped Head No.				
23	Black	Don't Walk	9 R	25	Black	Don't Walk	10 R	19	Black	Don't Walk	11 R	21	Black	Don't Walk	12 R	
	Blue	Walk	9 G		Blue	Walk	10 G		Blue	Walk	11 G		Blue	Walk	12 G	
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB	
Phase # 8 Ped Head No.				Phase # 2 Ped Head No.				Phase # 4 Ped Head No.				Phase # 6 Ped Head No.				
24	Black/White	Don't Walk	12 R	26	Black/White	Don't Walk	9 R	20	Black/White	Don't Walk	10 R	22	Black/White	Don't Walk	11 R	
	Blue/Black	Walk	12 G		Blue/Black	Walk	9 G		Blue/Black	Walk	10 G		Blue/Black	Walk	11 G	
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB	
Phase # 5 Head No.				Phase # 7 Head No.				Phase # 1 Head No.				Phase # 3 Head No.				
10	Red/Black	<< Red <<	5 R	15	Red/Black	<< Red <<	7 R	1	Red/Black	<< Red <<	1 R	6	Red/Black	<< Red <<	3 R	
	Orange/Black	<< Amber <<	5 Y		Orange/Black	<< Amber <<	7 Y		Orange/Black	<< Amber <<	1 Y		Orange/Black	<< Amber <<	3 Y	
	Green/Black	<< Green <<	11 Y		Green/Black	<< Green <<	12 Y		Green/Black	<< Green <<	9 Y		Green/Black	<< Green <<	10 Y	
	Black/Red	<FL Amber <-	5 G		Black/Red	<FL Amber <-	7 G		Black/Red	<FL Amber <-	1 G		Black/Red	<FL Amber <-	3 G	
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB	
Phase # 7 Head No.				Phase # 1 Head No.				Phase # 3 Head No.				Phase # 5 Head No.				
14	Red/Green	<< Red <<	7 R	18	Red/Green	<< Red <<	1 R	5	Red/Green	<< Red <<	3 R	9	Red/Green	<< Red <<	5 R	
	Orange/Red	<< Amber <<	7 Y		Orange/Red	<< Amber <<	1 Y		Orange/Red	<< Amber <<	3 Y		Orange/Red	<< Amber <<	5 Y	
	Green/White	<< Green <<	12 Y		Green/White	<< Green <<	9 Y		Green/White	<< Green <<	10 Y		Green/White	<< Green <<	11 Y	
	Blue/White	<FL Amber <-	7 G		Blue/White	<FL Amber <-	1 G		Blue/White	<FL Amber <-	3 G		Blue/White	<FL Amber <-	5 G	
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB	
Phase # 7 Head No.				Phase # 3 Head No.				Phase # 3 Head No.				Phase # 5 Head No.				
13	Red	See Phase #2, Head No. 13 above						4	Red	See Phase #6, Head No. 4 above						
	Orange								Orange							
	Green								Green							
	Black/Orange		<<Amber>>	3 Y					Black/Orange		<<Amber>>	7 Y				
	Black/Green		<<Green<<	3 G					Black/Green		<<Green<<	7 G				
	White	Ground/neutral	CB					White	Ground/neutral	CB						
PED. P.B.' s				PED. P.B.' s				PED. P.B.' s				PED. P.B.' s				
	Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11	
	Red/white	Phase 4	L 9		Red/white	Phase 4	L 9		Red/white	Phase 4	L 9		Red/white	Phase 4	L 9	
	Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11	
	Red/white	Phase 8	Q 9		Red/white	Phase 8	Q 9		Red/white	Phase 8	Q 9		Red/white	Phase 8	Q 9	
	White/Red	P.B. common	R 9 ~12		White/Red	P.B. common	R 9 ~12		White/Red	P.B. common	R 9 ~12		White/Red	P.B. common	R 9 ~12	

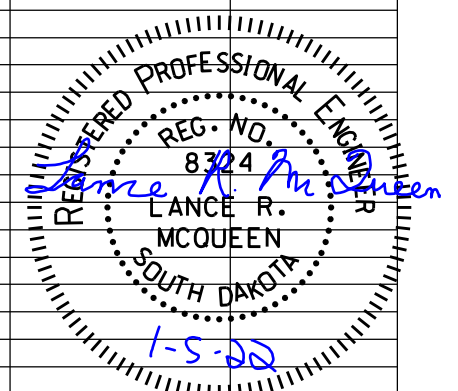
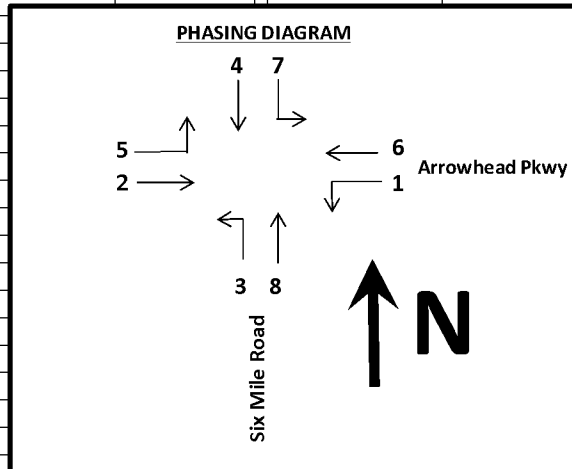


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Signal Wiring Diagram FOR BIDDING PURPOSES ONLY

Six Mile Road Intersection

CORNER	S3 - Southeast			CORNER	S4-Southwest			CORNER	S1-Northwest			CORNER	S2-Northeast		
	Cable # or color	Head Color	Controller		Cable # or color	Head Color	Controller		Cable # or color	Head Color	Controller		Cable # or color	Head Color	Controller
Phase # 2			Terminal Designation	Phase # 4			Terminal Designation	Phase # 6			Terminal Designation	Phase # 8			Terminal Designation
Head No.	Wire Color	Head Color		Head No.	Wire Color	Head Color		Head No.	Wire Color	Head Color		Head No.	Wire Color	Head Color	
13,14,15	Red	Red	2 R	18,19,20	Red	Red	4 R	2,3,4	Red	Red	6 R	7,8,9	Red	Red	8 R
	Orange	Amber	2 Y		Orange	Amber	4 Y		Orange	Amber	6 Y		Orange	Amber	8 Y
	Green	Green	2 G		Green	Green	4 G		Green	Green	6 G		Green	Green	8 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
Phase # 2 Ped				Phase # 4 Ped				Phase # 6 Ped				Phase # 8 Ped			
Head No.				Head No.				Head No.				Head No.			
26	Black	Don't Walk	9 R	28	Black	Don't Walk	10 R	22	Black	Don't Walk	11 R	24	Black	Don't Walk	12 R
	Blue	Walk	9 G		Blue	Walk	10 G		Blue	Walk	11 G		Blue	Walk	12 G
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB
Phase # 8 Ped				Phase # 2 Ped				Phase # 4 Ped				Phase # 6 Ped			
Head No.				Head No.				Head No.				Head No.			
27	Black/White	Don't Walk	12 R	29	Black/White	Don't Walk	9 R	23	Black/White	Don't Walk	10 R	25	Black/White	Don't Walk	11 R
	Blue/Black	Walk	12 G		Blue/Black	Walk	9 G		Blue/Black	Walk	10 G		Blue/Black	Walk	11 G
	White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB		White/Black	Ground/neutral	CB
Phase # 5				Phase # 7				Phase # 1				Phase # 3			
Head No.				Head No.				Head No.				Head No.			
11,12	Red/Black	<< Red <<	5 R	17	Red/Black	<< Red <<	7 R	1	Red/Black	<< Red <<	1 R	6	Red/Black	<< Red <<	3 R
	Orange/Black	<< Amber <<	5 Y		Orange/Black	<< Amber <<	7 Y		Orange/Black	<< Amber <<	1 Y		Orange/Black	<< Amber <<	3 Y
	Green/Black	<< Green <<	11 Y		Green/Black	<< Green <<	12 Y		Green/Black	<< Green <<	9 Y		Green/Black	<< Green <<	10 Y
	Black/Red	<FL Amber <-	5 G		Black/Red	<FL Amber <-	7 G		Black/Red	<FL Amber <-	1 G		Black/Red	<FL Amber <-	3 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
Phase # 7				Phase # 1				Phase # 3				Phase # 5			
Head No.				Head No.				Head No.				Head No.			
16	Red/Green	<< Red <<	7 R	21	Red/Green	<< Red <<	1 R	5	Red/Green	<< Red <<	3 R	10	Red/Green	<< Red <<	5 R
	Orange/Red	<< Amber <<	7 Y		Orange/Red	<< Amber <<	1 Y		Orange/Red	<< Amber <<	3 Y		Orange/Red	<< Amber <<	5 Y
	Green/White	<< Green <<	12 Y		Green/White	<< Green <<	9 Y		Green/White	<< Green <<	10 Y		Green/White	<< Green <<	11 Y
	Blue/White	<FL Amber <-	7 G		Blue/White	<FL Amber <-	1 G		Blue/White	<FL Amber <-	3 G		Blue/White	<FL Amber <-	5 G
	White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB		White	Ground/neutral	CB
PED. P.B.'s				PED. P.B.'s				PED. P.B.'s				PED. P.B.'s			
	Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11		Blue/Red	Phase 2	L 11
	Red/white	Phase 4	L 9		Red/white	Phase 4	L 9		Red/white	Phase 4	L 9		Red/white	Phase 4	L 9
	Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11		Blue/Red	Phase 6	Q 11
	Red/white	Phase 8	Q 9		Red/white	Phase 8	Q 9		Red/white	Phase 8	Q 9		Red/white	Phase 8	Q 9
	White/Red	P.B. common	R 9 ~12		White/Red	P.B. common	R 9 ~12		White/Red	P.B. common	R 9 ~12		White/Red	P.B. common	R 9 ~12



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Lighting Wiring Diagram FOR BIDDING PURPOSES ONLY



1/2 Mile Intersection

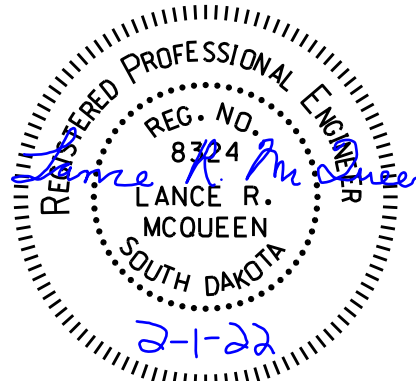
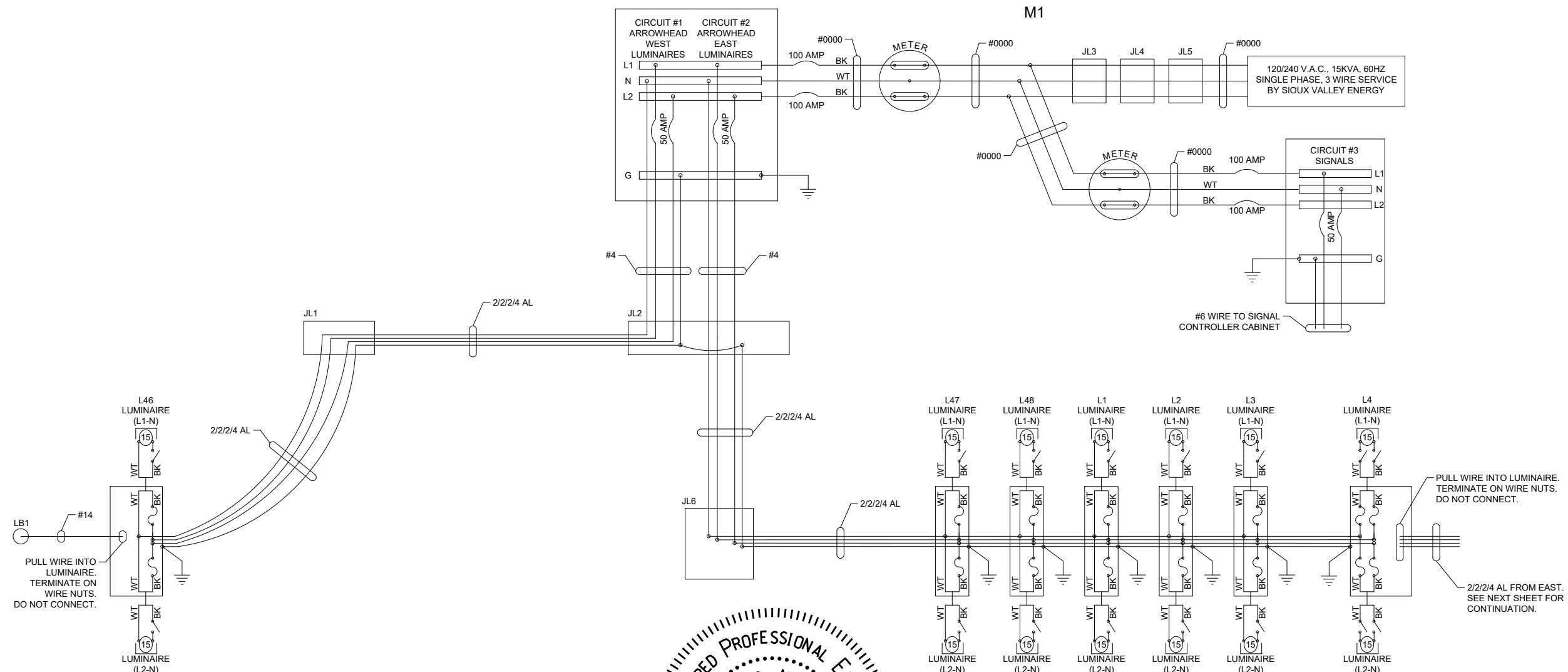
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L47	L60
REV DATE: 2/01/2022		INITIAL: LRM	

M1 LOAD SUMMARY				
Circuit #	No. of 159W Luminaires	Signals	ID	Load (Amps)
1	14		L46, Future Lights L40, L41, L42, L43, L44, L45	9.28
2	12		L47, L48, L1, L2, L3, L4	7.95
3		1	Signal Cabinet	3.00
Total:				20.23
Minimum Size Required for Main Circuit Breaker*:				50 Amps
Total KVA:				4.85

*Based Upon an 80% Rated Circuit Breaker

NOTE:
ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

LEGEND
 159W LED LUMINAIRE
 FUSES PER CITY SPECIFICATIONS



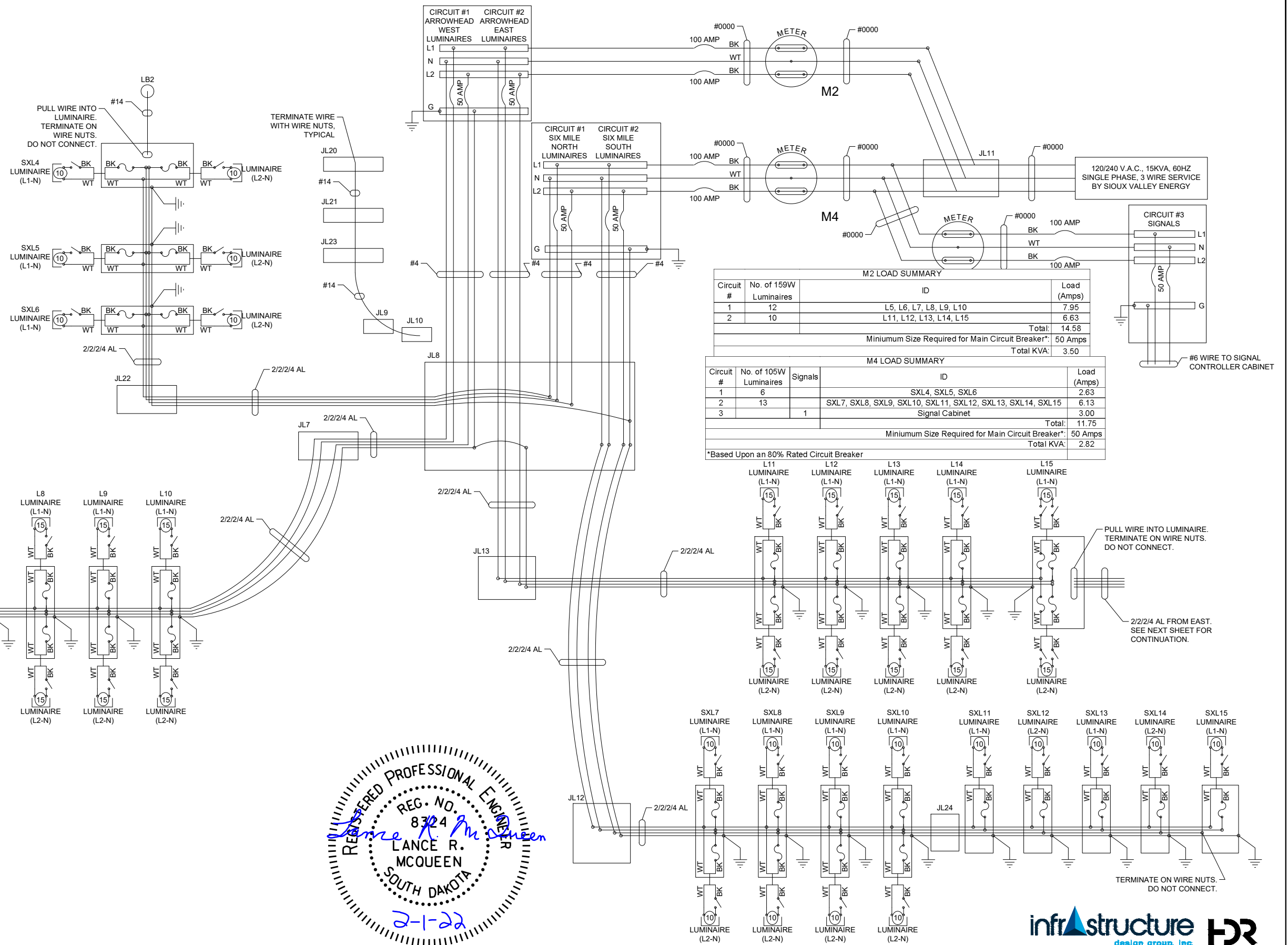
Lighting Wiring Diagram FOR BIDDING PURPOSES ONLY

Six Mile Road

NOTE:
ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

LEGEND

- (15) 159W LED LUMINAIRE
FUSES PER CITY SPECIFICATIONS
- (10) 105W LED LUMINAIRE
FUSES PER CITY SPECIFICATIONS



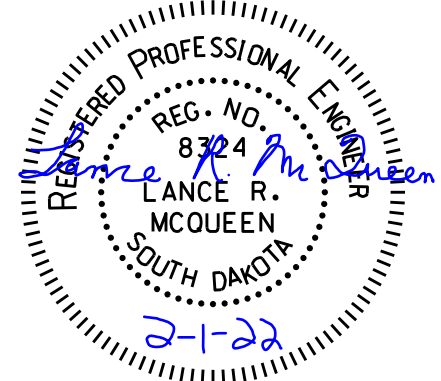
M2 LOAD SUMMARY

Circuit #	No. of 159W Luminaires	ID	Load (Amps)
1	12	L5, L6, L7, L8, L9, L10	7.95
2	10	L11, L12, L13, L14, L15	6.63
Total:			14.58
Minimum Size Required for Main Circuit Breaker:			50 Amps
Total KVA:			3.50

M4 LOAD SUMMARY

Circuit #	No. of 105W Luminaires	Signals	ID	Load (Amps)
1	6		SXL4, SXL5, SXL6	2.63
2	13		SXL7, SXL8, SXL9, SXL10, SXL11, SXL12, SXL13, SXL14, SXL15	6.13
3		1	Signal Cabinet	3.00
Total:				11.75
Minimum Size Required for Main Circuit Breaker:				50 Amps
Total KVA:				2.82

*Based Upon an 80% Rated Circuit Breaker



Lighting Wiring Diagram FOR BIDDING PURPOSES ONLY


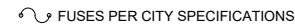
Willow Run Entrance

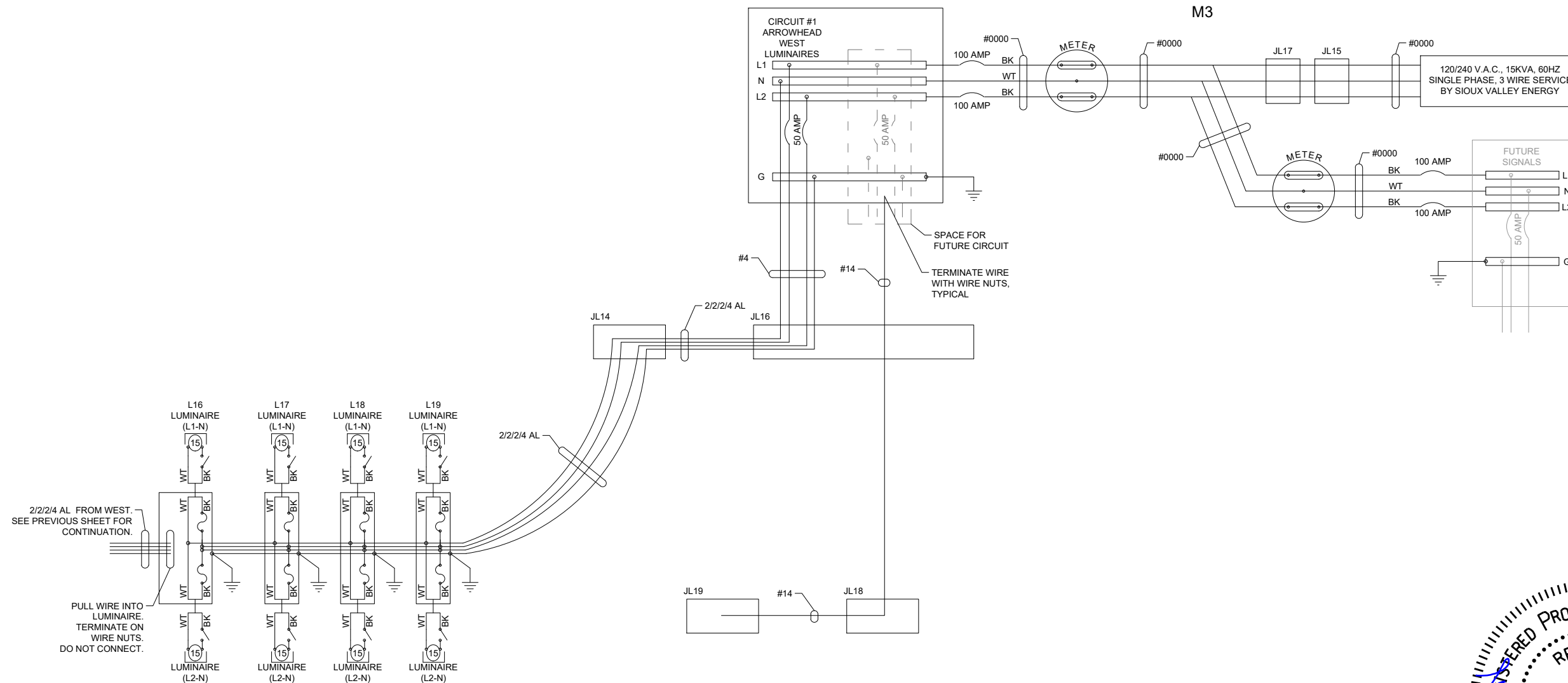
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L49	L60
REV DATE: 2/01/2022		INITIAL: LRM	

M3 LOAD SUMMARY				
Circuit #	No. of 159W Luminaires	Future Signals	ID	Load (Amps)
1	8		L16, L17, L18, L19	5.30
2	6		Future Lights - FL1, FL2, FL3	3.98
3		1	Future Signal Cabinet	3.00
			Total:	12.28
Minimum Size Required for Main Circuit Breaker*:				50 Amps
Total KVA:				2.95

*Based Upon an 80% Rated Circuit Breaker

NOTE:
ALL CIRCUITS WILL BE BONDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

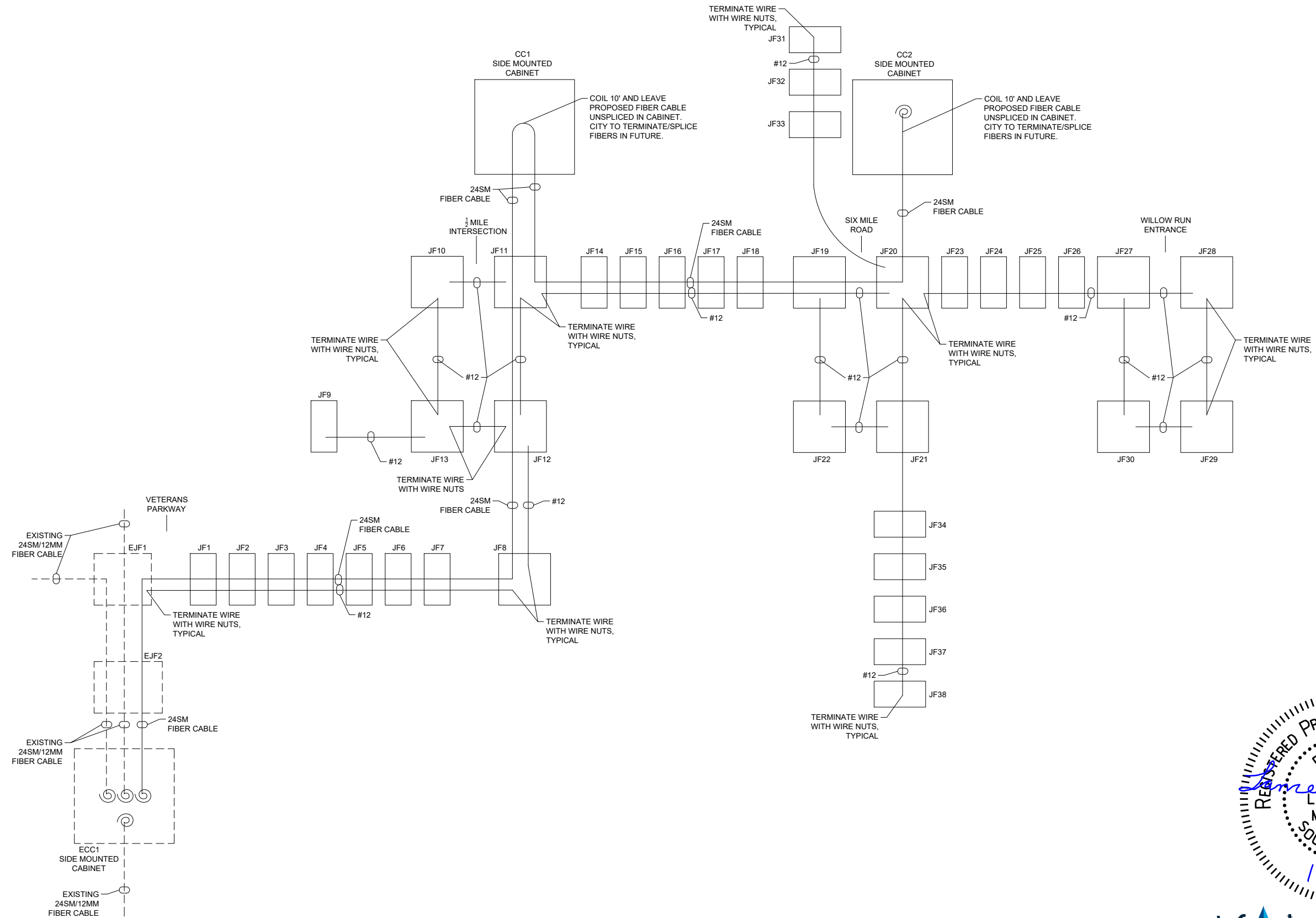
LEGEND
 159W LED LUMINAIRE
 FUSES PER CITY SPECIFICATIONS



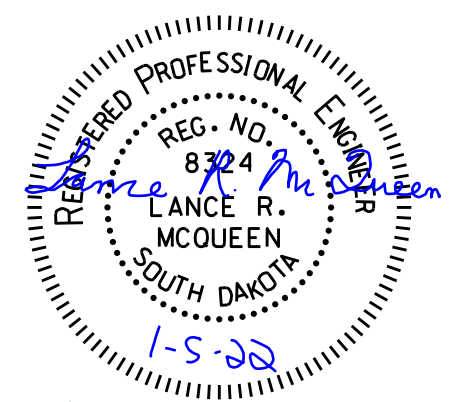
Fiber Optic Cable Wiring Diagram

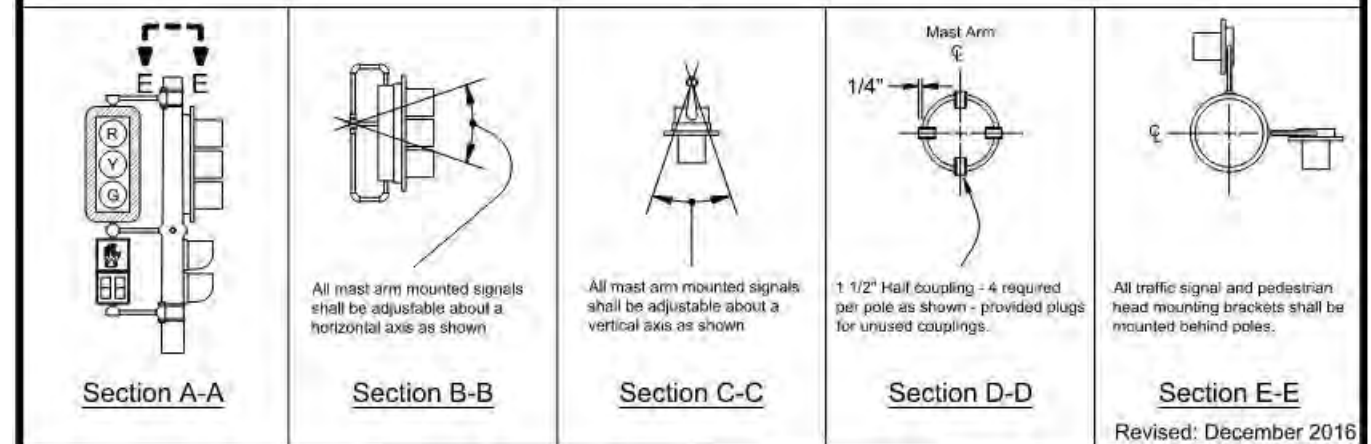
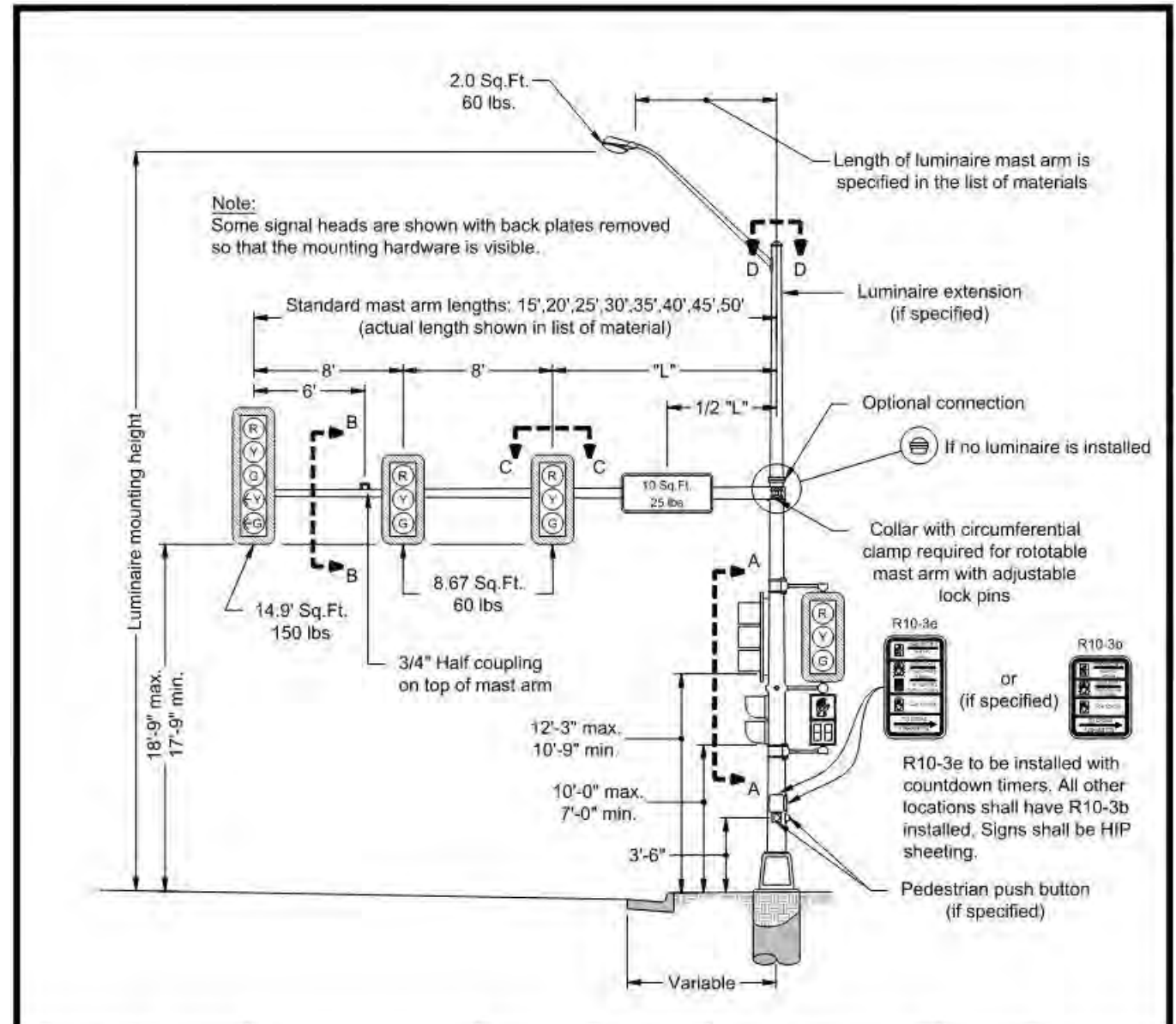
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 2042(29) P 1358(02) NH 0042(63)371	L50	L60

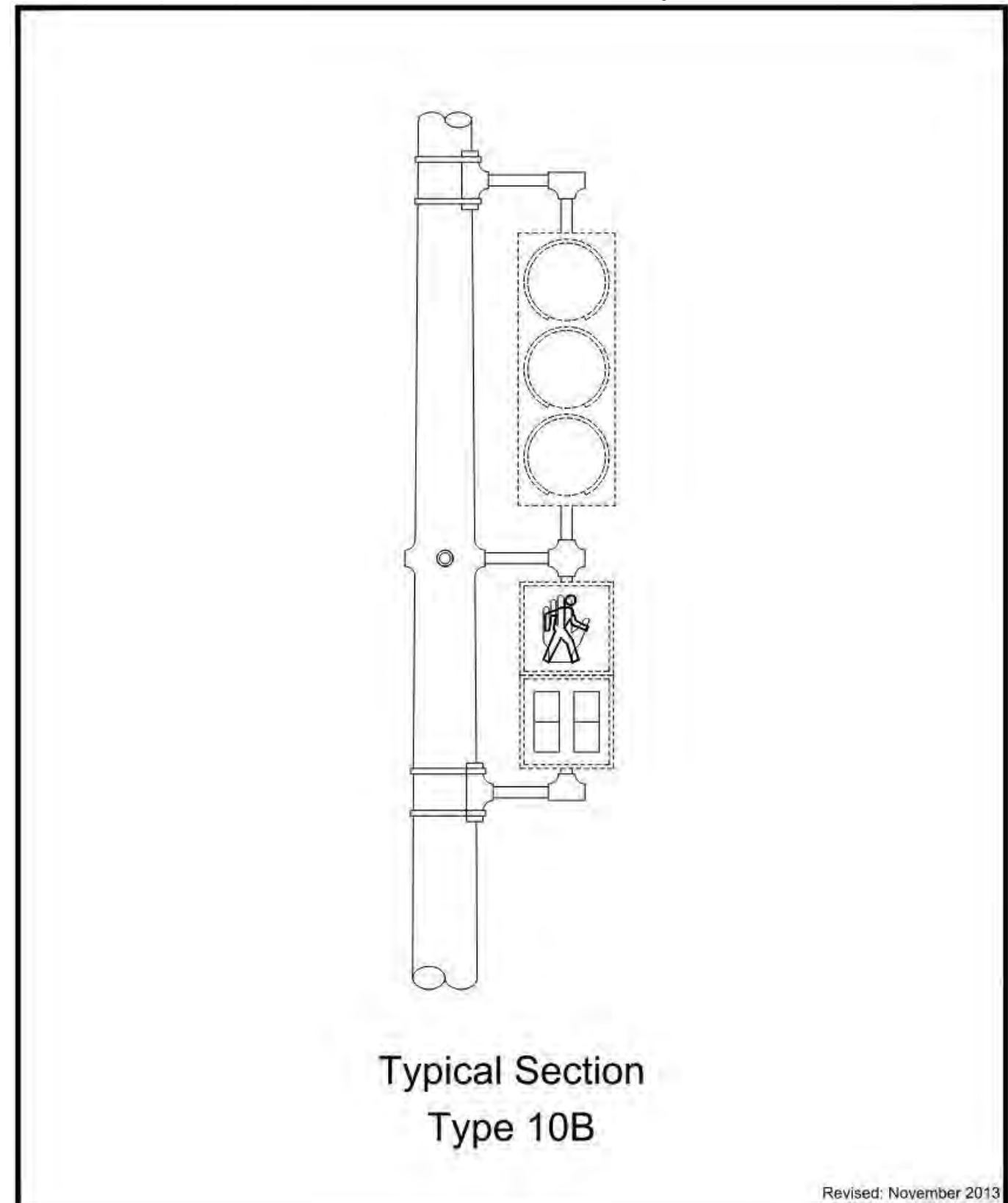


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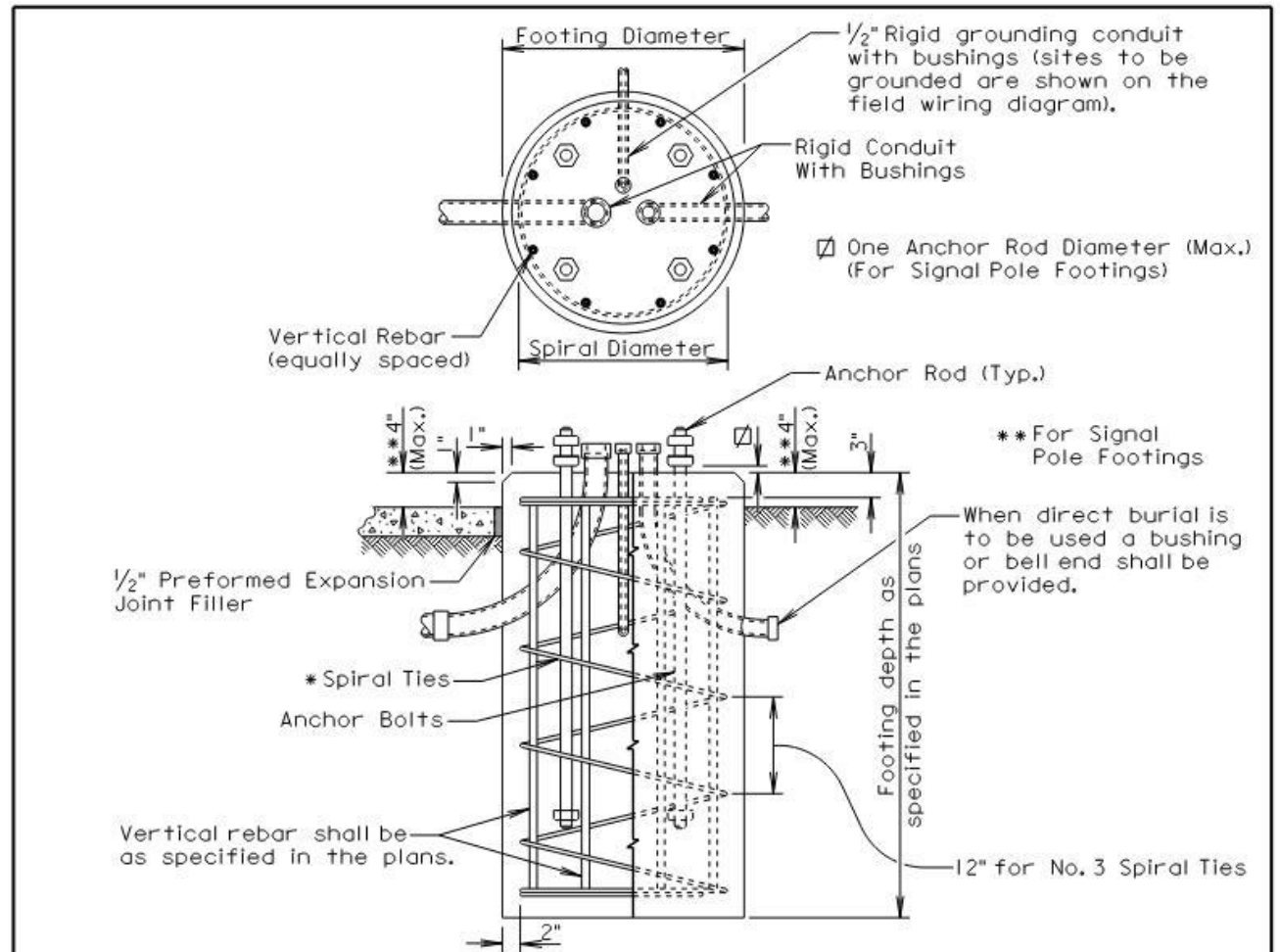


Section A-A	Section B-B	Section C-C	Section D-D	Section E-E
Revised: December 2016				



	Signal and Pedestrian Head Mounting Brackets	Specification Reference No. 635A	Plate Number 635.05
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Revised: November 2013

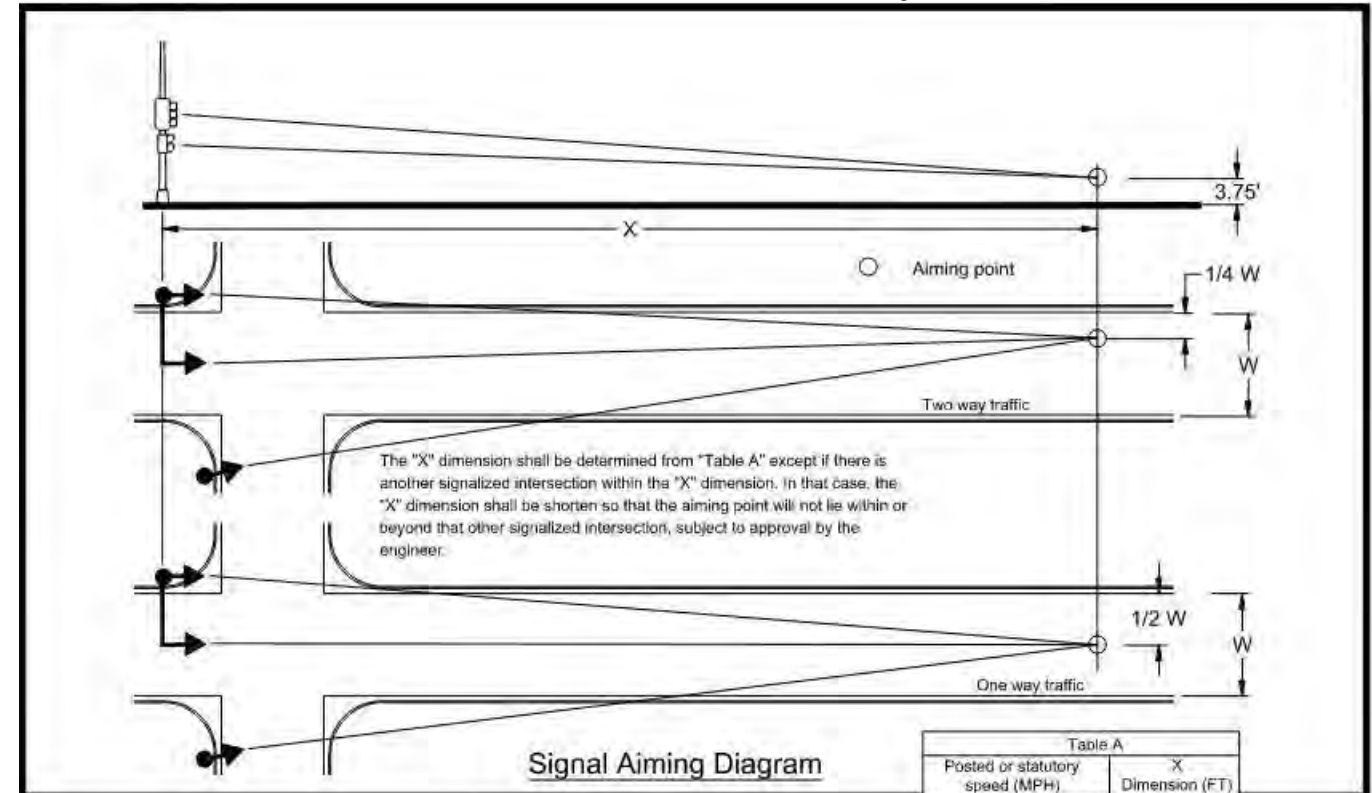


GENERAL NOTES:

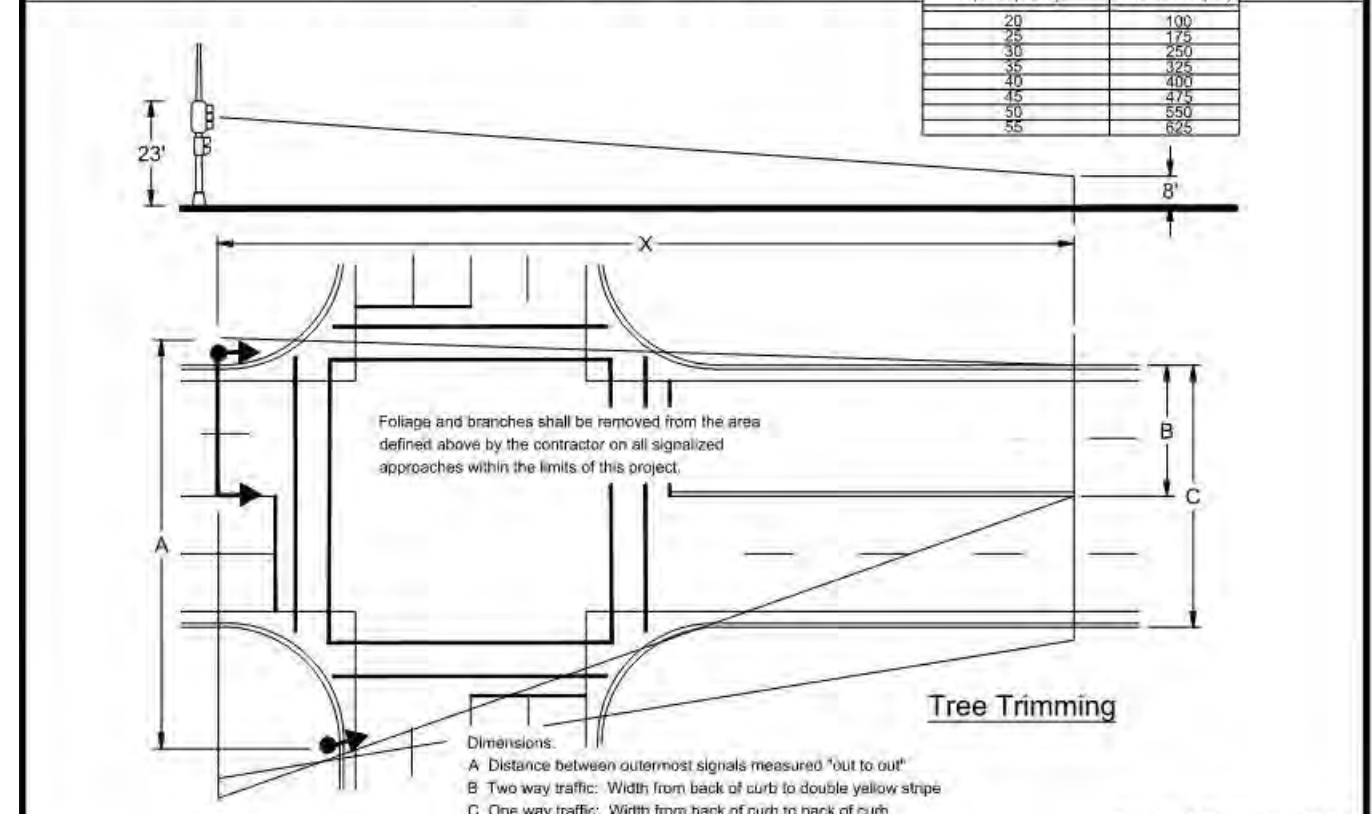
- * Circular ties may be used in lieu of the spiral ties. The No. 3 ties shall be spaced 12 inches apart except for the top two which shall be spaced 6 inches apart. The ties shall be lapped 18 inches and the laps shall be staggered around the cage.
- Spiral ties shall have 1-1/2 extra turns at each end.
- See Section 985 of the Specifications for footing materials.
- Conduits and bushings may project 2 1/2 inches to 6 inches above footing for fixed base poles but shall not project above the slip plane or fracture plane for breakaway poles.
- Conduits shall be sealed water-tight during all phases of construction until poles are in place.
- The anchor rods shall fit inside the reinforcing steel cage. If the anchor rods designed by the Pole Manufacturer do not fit, contact the Office of Bridge Design for footing redesign. No additional payment will be made for the redesigned footing.
- Costs of conduit and conduit bushings shown on footing detail shall be incidental to the footing bid item(s).
- The pole shall not be installed until the concrete has attained design strength (4000 psi).
- The contour of the area surrounding the breakaway pole shall be flat, though not necessarily level for a distance of 5 feet in all directions. The Contractor may be required to provide finish grading at some breakaway pole locations.

June 26, 2015

Published Date: 4th Qtr. 2021	S D D O T	POLE FOOTING	PLATE NUMBER 635.55
			Sheet 1 of 1



Posted or statutory speed (MPH)	X Dimension (FT)
20	100
25	175
30	250
35	325
40	400
45	475
50	550
55	625

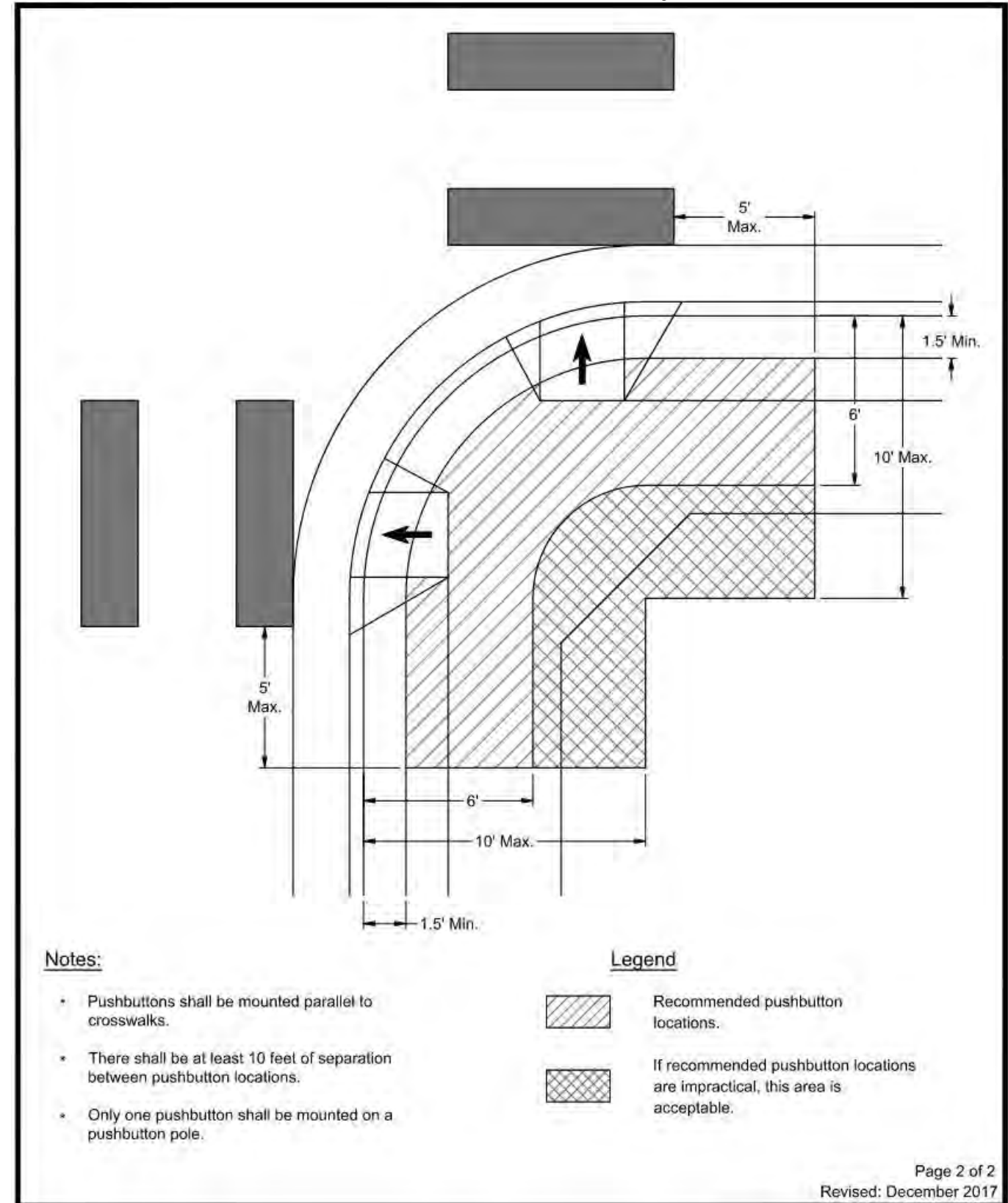
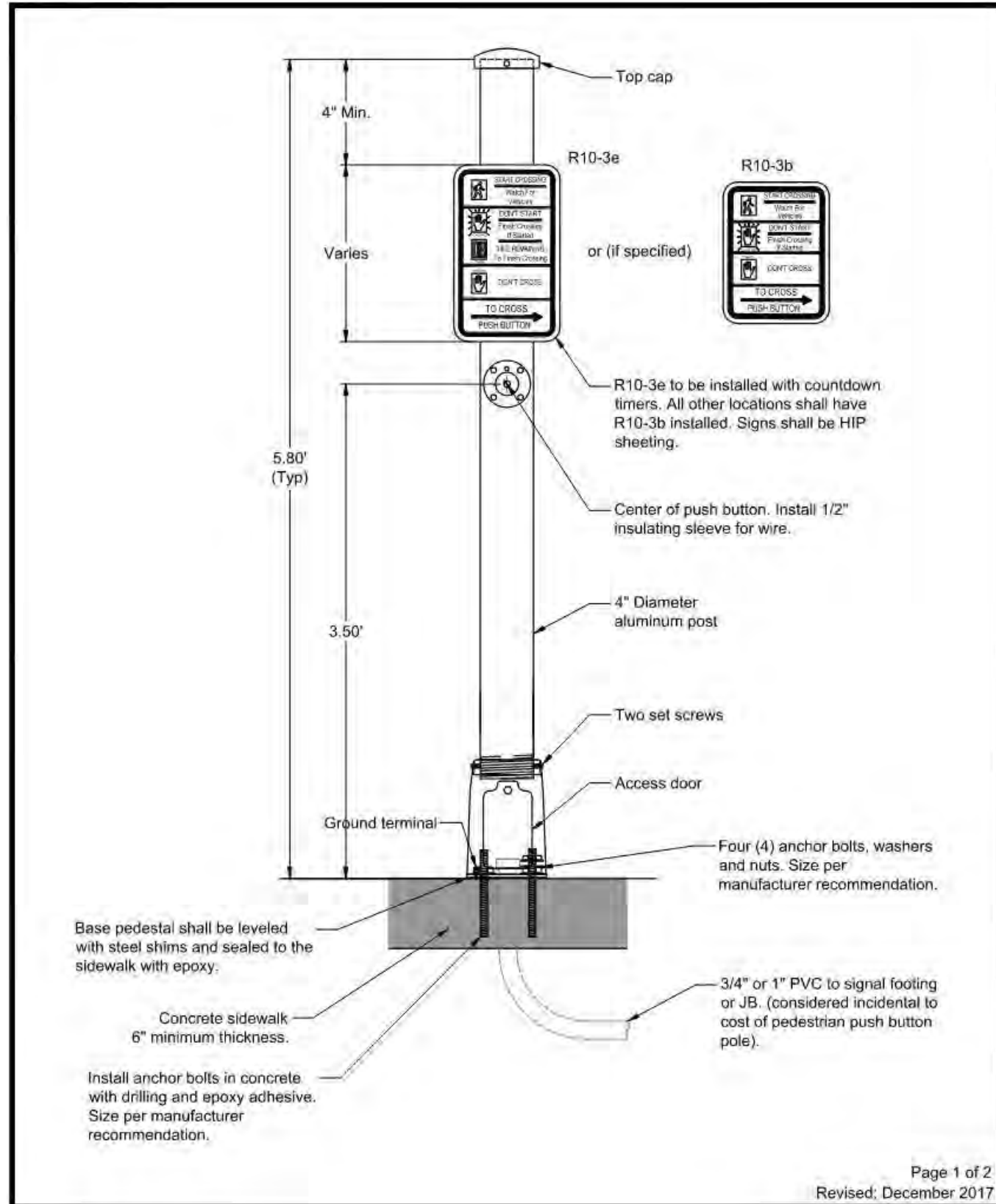


- Dimensions:
- A Distance between outermost signals measured "out to out"
 - B Two way traffic: Width from back of curb to double yellow stripe
 - C One way traffic: Width from back of curb to back of curb

Revised: December 2007

CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!	Traffic Signal Head Alignment	Specification Reference No. 635A	Plate Number 635.08



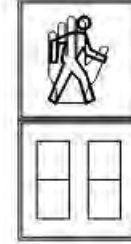
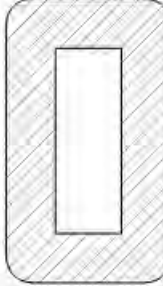
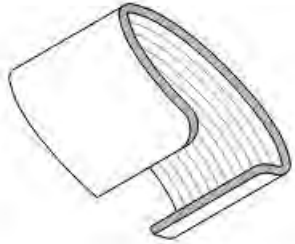
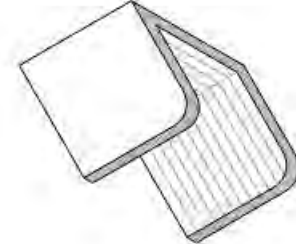




FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) NH 0042(63)371 P 1358(02)	SHEET NO. L54	TOTAL SHEETS L60
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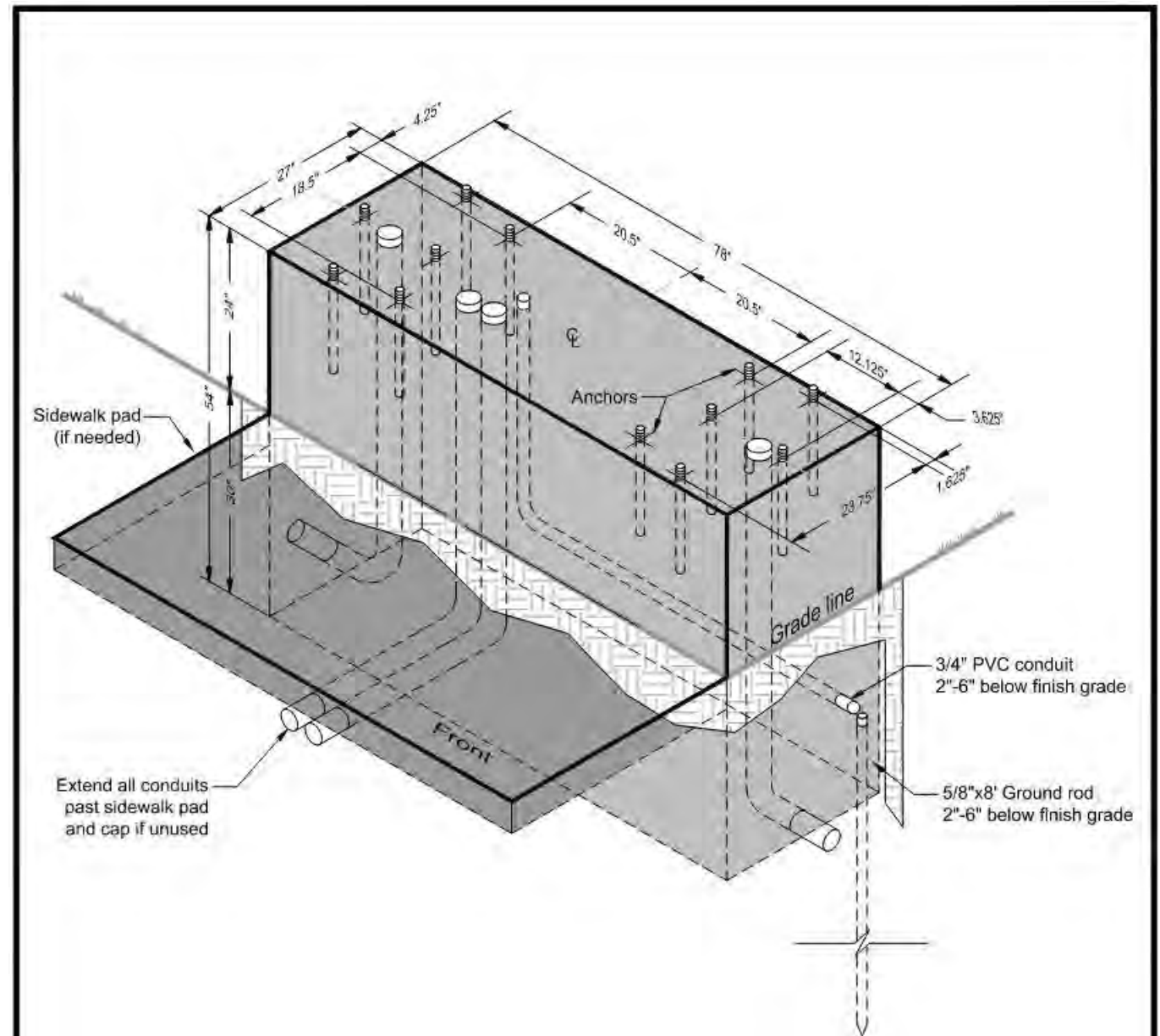
Plotting Date: 1/1/2022

 <p>All lenses to be 12" in diameter</p> <p>One way 5-section traffic signal</p>	 <p>All lenses to be 12" in diameter</p> <p>One way 3-section traffic signal</p>	
 <p>One way 1-section pedestrian signal</p>	 <p>Typical 5" back plate</p>	
 <p>(V-1) Tunnel visor</p>	 <p>(V-6) Pedestrian</p>	

Revised: November 2013

 <p>CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!</p>	Traffic Signal Head and Pedestrian Head Plate	Specification Reference No. 635A	Plate Number 635.10
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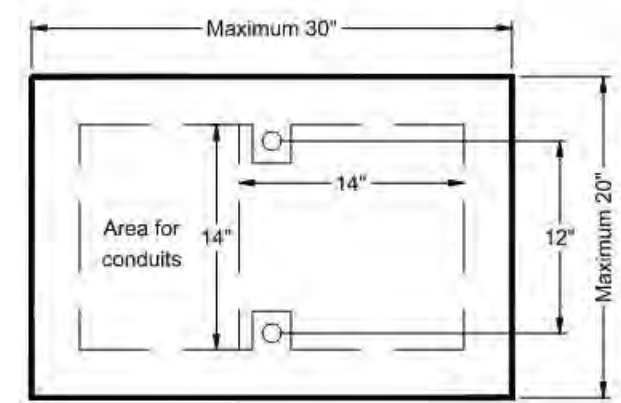
General Notes:

1. Verify anchor bolt placement with cabinet manufacturers and shop drawings.
2. 5/8" Dia. x 18" galvanized anchors shall be 2" above finished concrete.
3. Conduits shall be 2" to 3" above finished concrete.
4. Conduit to be rigid steel and have threads so the grounding bushings can be installed.
5. Concrete shall be level and steel trowel finished.
6. 5/8"x8" Ground rod shall be installed 2"-6" below finished grade.
7. 3/4" PVC conduit shall end adjacent to the ground rod.

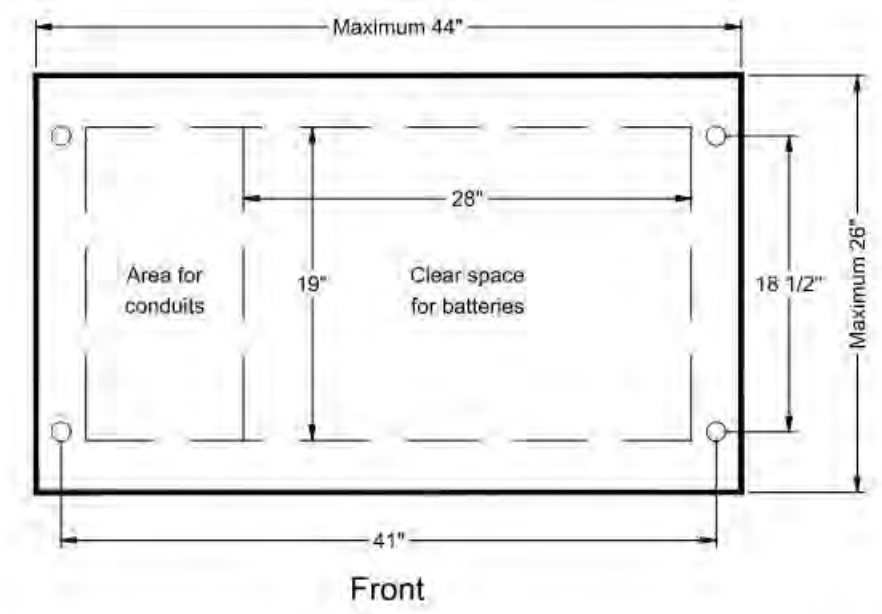
Revised: December 2017

	Controller Cabinet Footing for Eight Phase Signal	Specification Reference	Plate Number
		No. 635A	635.17

Top View Four-Phase Controller Cabinets:



Top View Eight-Phase Controller Cabinets:



Revised: November 2013

	Traffic Signal Controller Cabinet Size and Bolt Hole Requirements	Specification Reference	Plate Number
		No. 635A	635.19



Cast Iron Cover

- 12" JB - Neenah Foundry Co. R-5900-A series or engineer approved.
- 18" JB - Neenah Foundry Co. R-5900-C series or engineer approved
- 24" JB - Neenah Foundry Co. R-5900-E series or engineer approved
- 30" JB - Neenah Foundry Co. R-5900-G series or engineer approved

Notes:

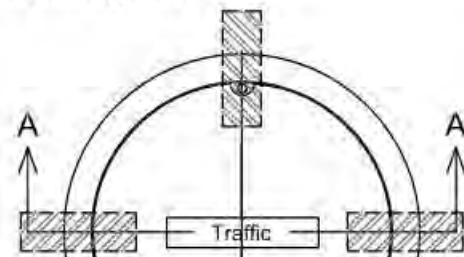
- Allow sufficient slack so that cable ends can be pulled to 30" above junction box.
- Number of conduit entrances varies with location of junction box.
- Anchor frame to pipe as approved by the engineer.
- Cover shall be stamped traffic.

All conduits coming into and leaving the junction box will be rigid steel and for at least (5) feet outside of the junction box. These conduit will have a grounding bushing attached and a grounding wire installed to bond all conduits to the junction box using an appropriately sized terminal lug bolted to the wall of the junction box.

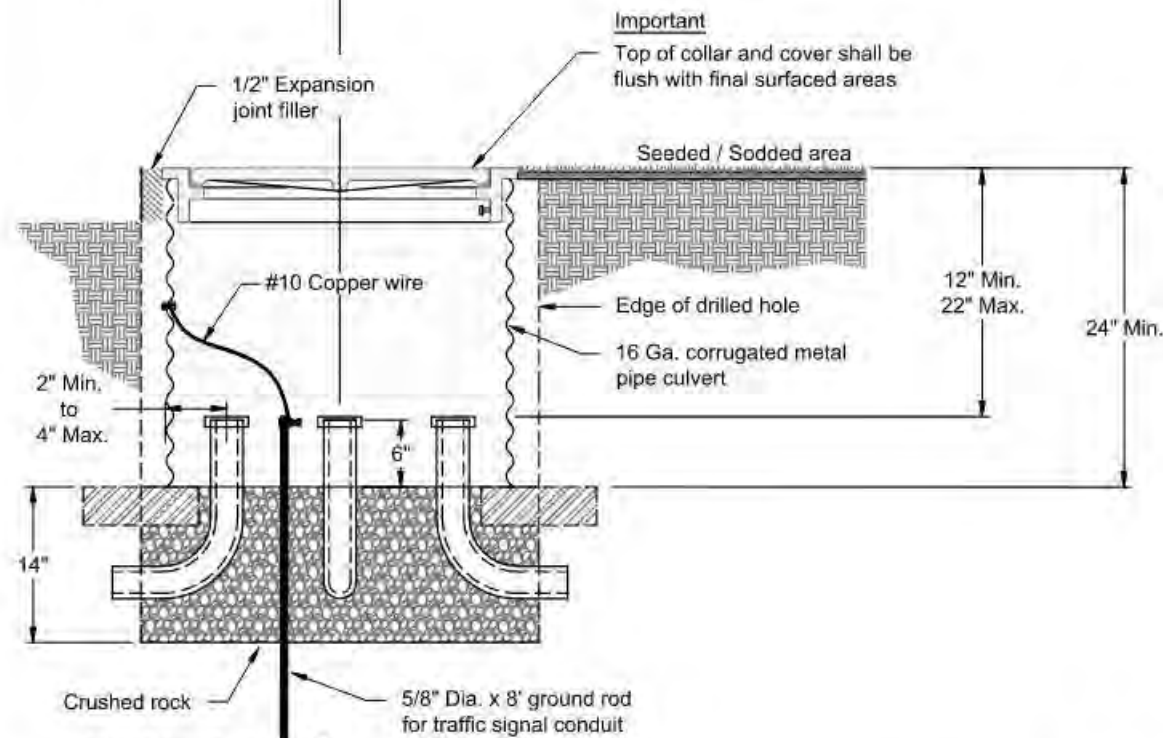
Slots cut in culvert must be repaired. Permanently fastened from the outside and made out of culvert material. Infiltration point shall be sprayed with foam from the outside.

The junction box sizes and quantities are shown on the plan sheets.

⊛ When junction box is used for traffic signal conduit a ground rod will be installed in the bottom of the junction box. It shall not protrude more than (6) inches out of the crushed rock.



4 Bricks spaced evenly around the bottom edge of the junction box



Section A-A ⊛

Revised: October 2020

Cast Iron Cover

- 18" JB - Neenah Foundry Co. R-5900-C series or engineer approved
- 24" JB - Neenah Foundry Co. R-5900-E series or engineer approved
- 30" JB - Neenah Foundry Co. R-5900-G series or engineer approved

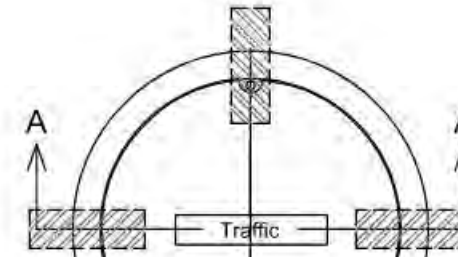
Notes:

- Allow sufficient slack so that cable ends can be pulled to 30" above junction box.
- Number of conduit entrances varies with location of junction box.
- Anchor frame to pipe as approved by the engineer.
- Cover shall be stamped traffic.

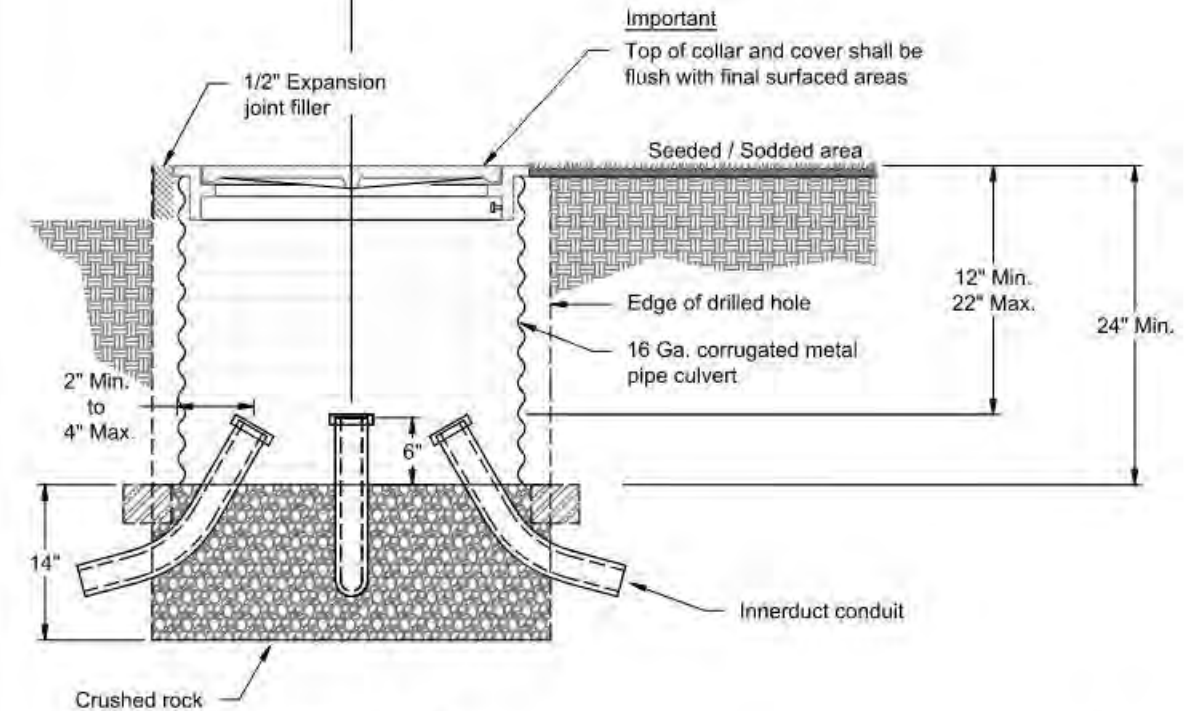
The ends of the innerduct conduit in the junction box shall be sealed with a water proof sealant to prevent water infiltration into the conduit.

Slots cut in culvert must be repaired. Permanently fastened from the outside and made out of culvert material. Infiltration point shall be sprayed with foam from the outside.

The junction box sizes and quantities are shown on the plan sheets.

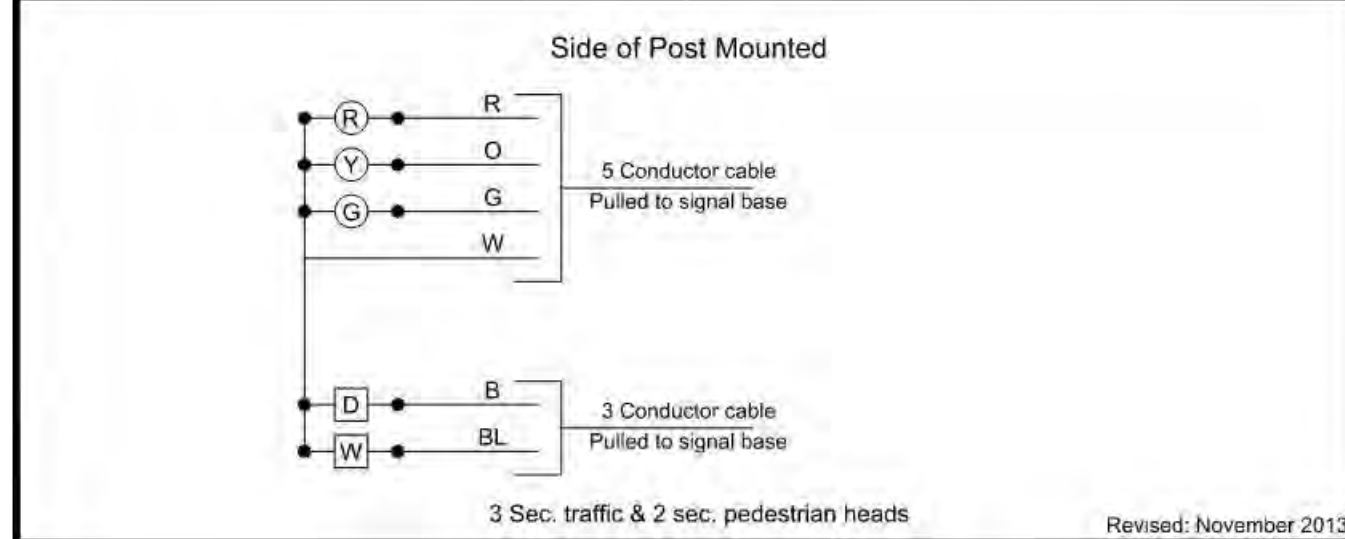
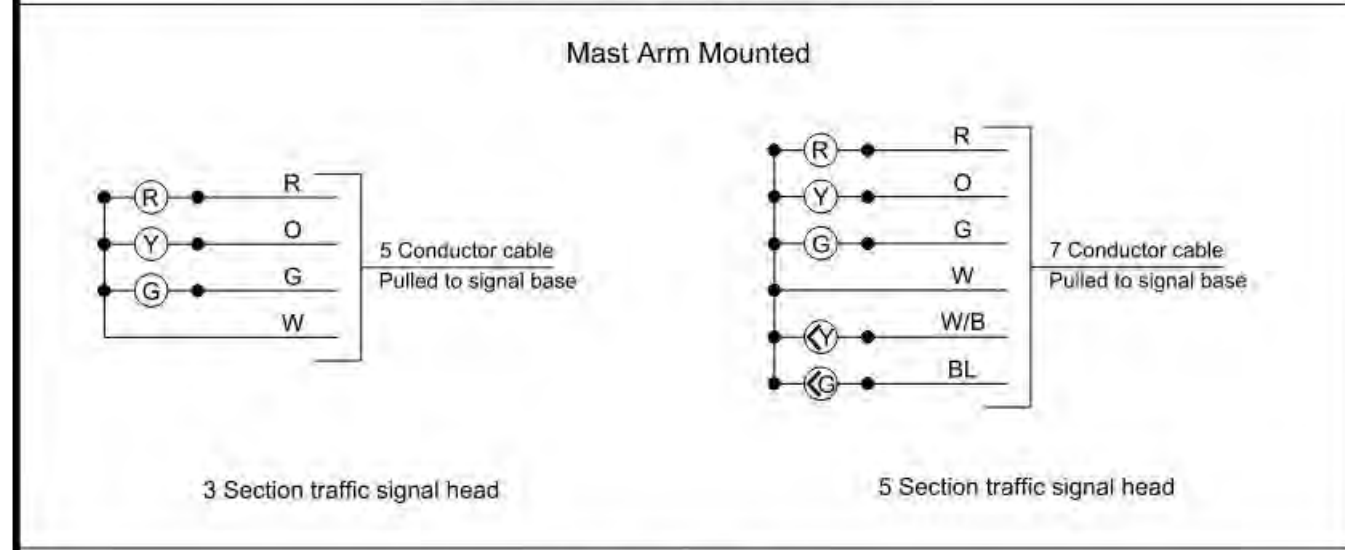
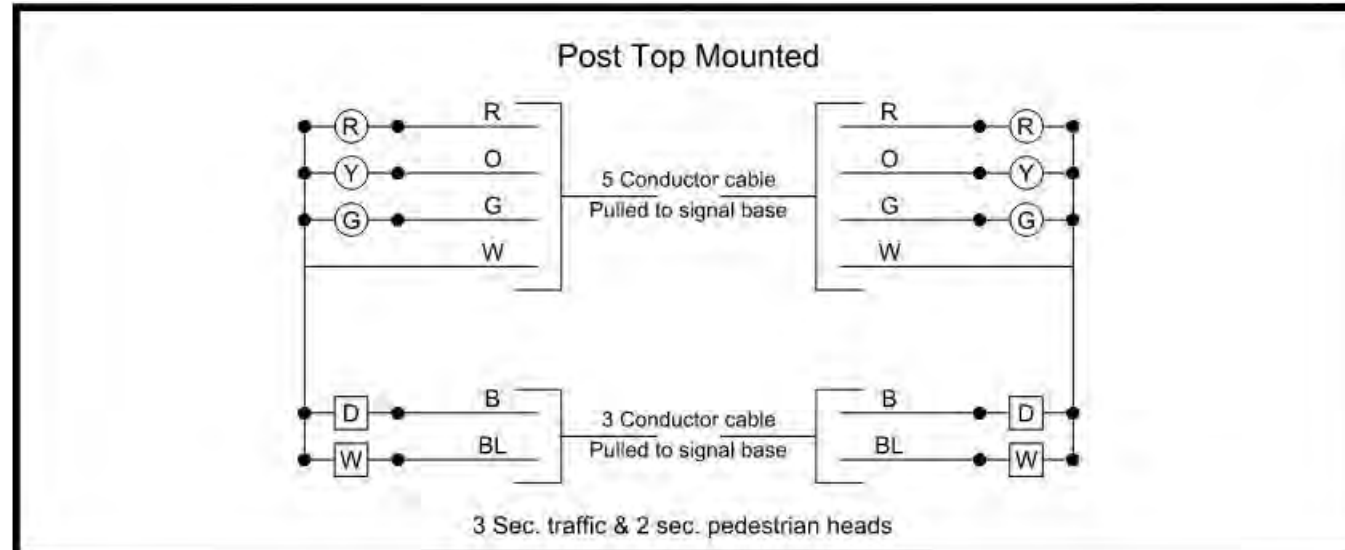


4 Bricks spaced evenly around the bottom edge of the junction box

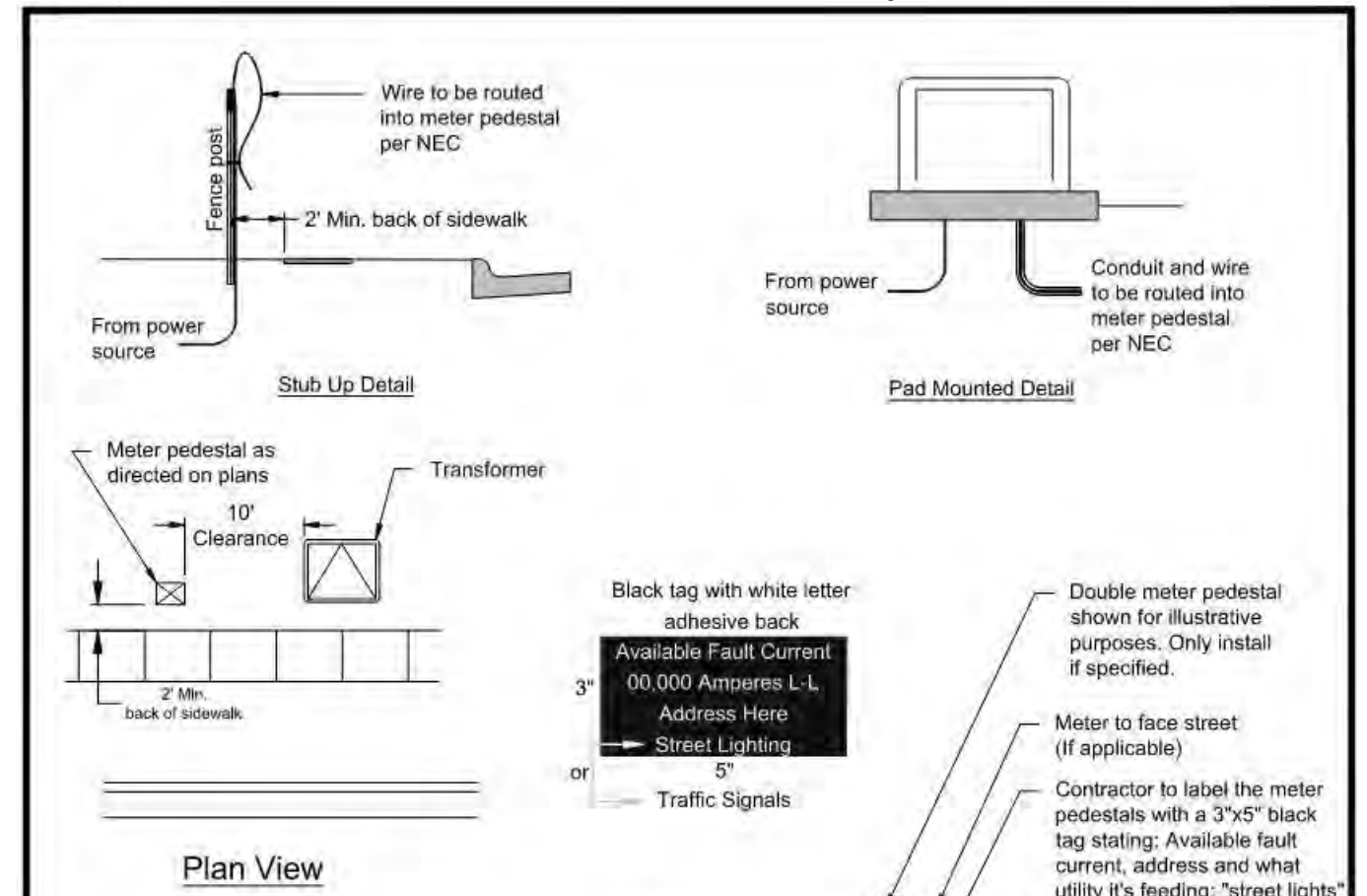


Section A-A

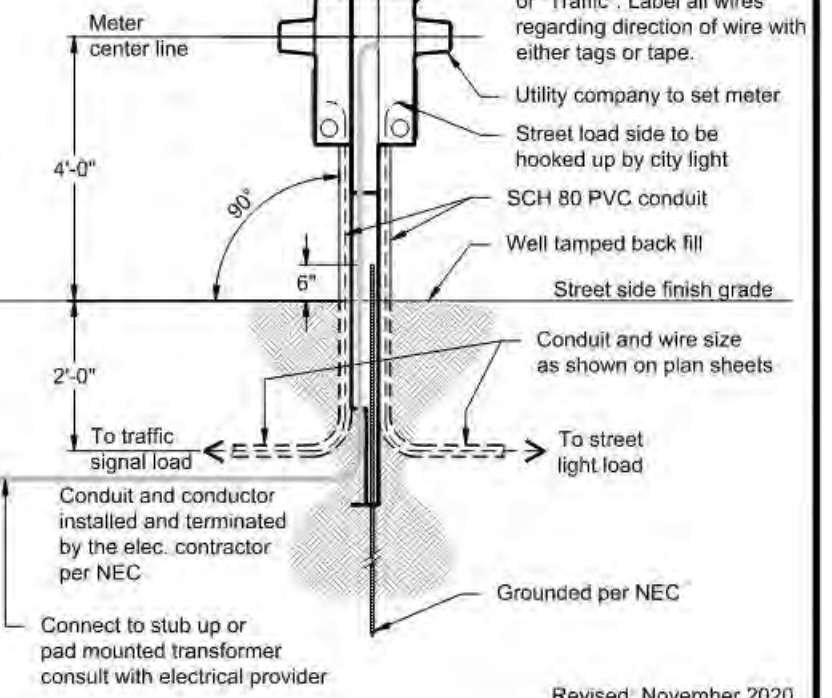
Revised: October 2020



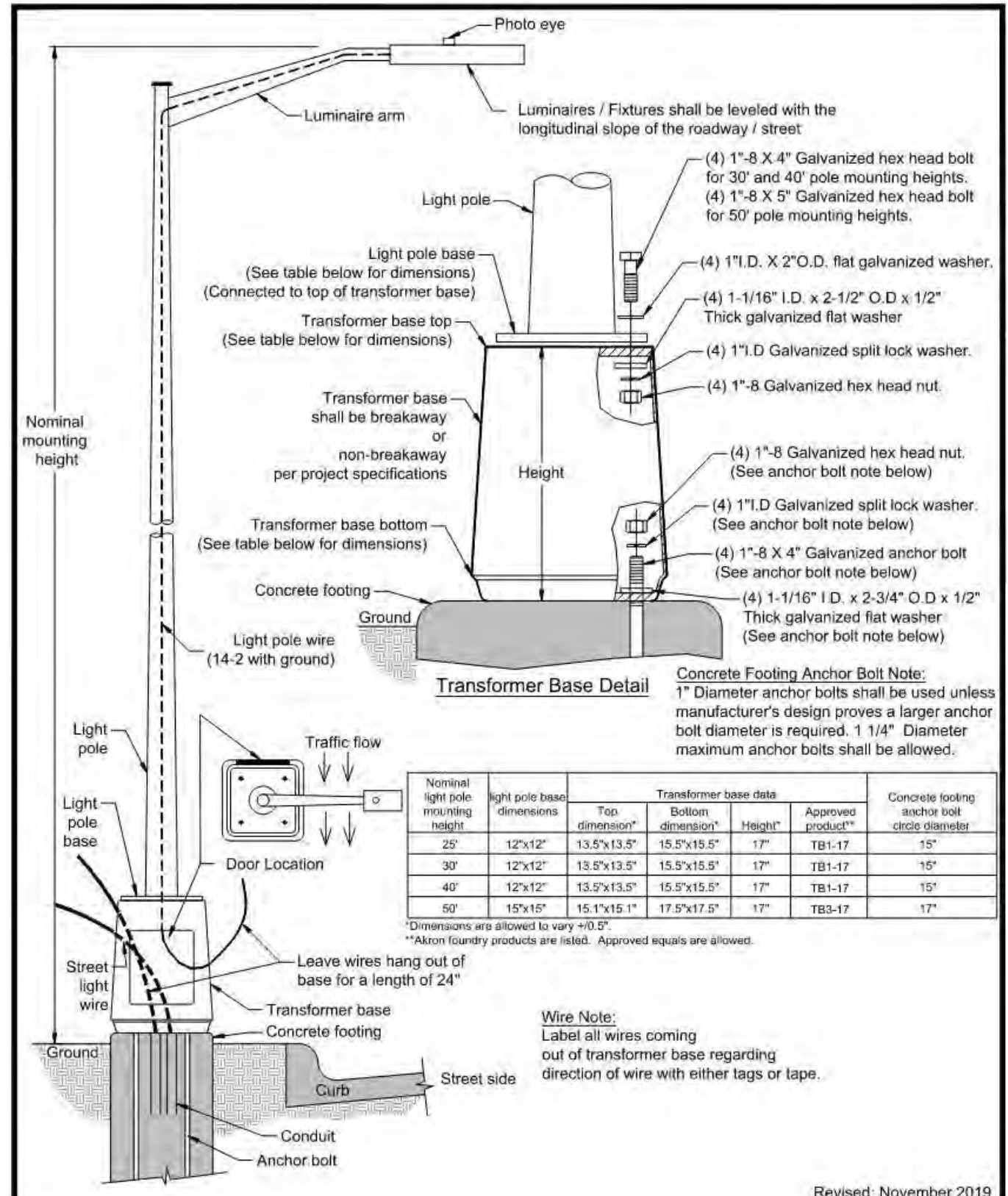
Revised: November 2013



- Notes:**
- All power outlet panels must be fully bussed
 - Must be an outdoor enclosure (Type 3R)
 - Must meet all construction site ground fault protection requirements
 - Grounding rod furnished by contractor
 - Meter pedestal furnished by contractor
 - Milbank U5701-0-200S-5T9 terminal, single meter pedestal
 - Milbank U5702-0-200S-5T9 terminal, double meter pedestal
 - Traffic signal power feeds shall include one (1) 50 amp single pole breaker.
 - Lighting power feeds shall include two (2) 50 amp double pole breakers.
 - All materials and labor on secondary side of transformer shall be supplied by the contractor and terminated.
 - All work to conform with national electric code

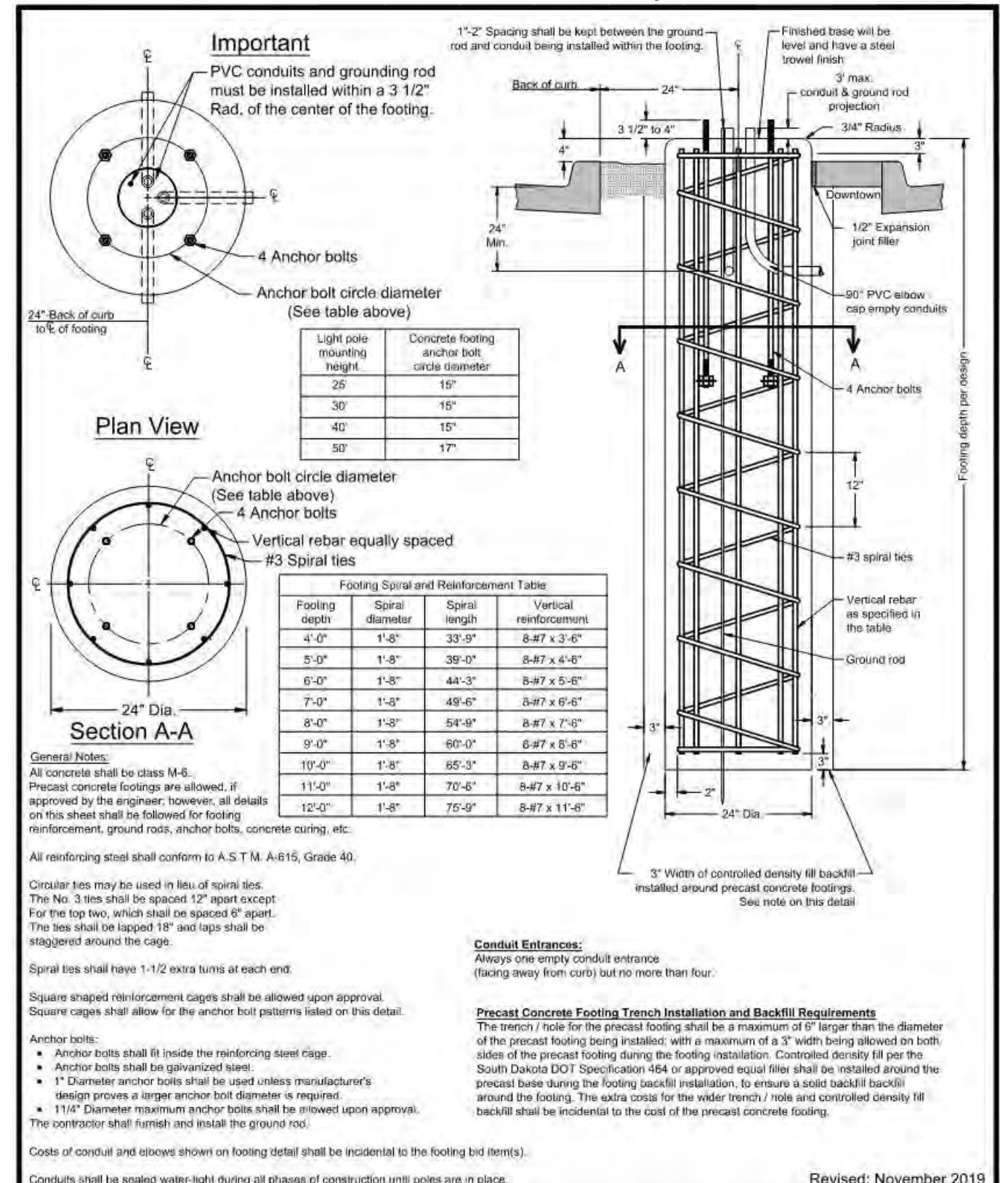


Revised: November 2020



Revised: November 2019

<p>CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!</p>	<p>Street Light Standard T-Base</p>	Specification Reference	Plate Number
		No. 635B	635.56



Revised: November 2019

<p>CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!</p>	<p>Street Light Footing</p>	Specification Reference	Plate Number
		No. 635B	635.60

STATE OF SOUTH DAKOTA	PROJECT NH 2042(29) NH 0042(63)371 P 1358(02)	SHEET NO. L59	TOTAL SHEETS L60
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Plotting Date: 1/1/2022

Cast Iron Cover

18" Dia. JB - Neenah Foundry Company
R-5900-C Series or engineer approved.

24" Dia. JB - Neenah Foundry Company
R-5900-E Series or engineer approved.

Notes:

Allow sufficient slack so that cable ends can be pulled to 18" above junction box.

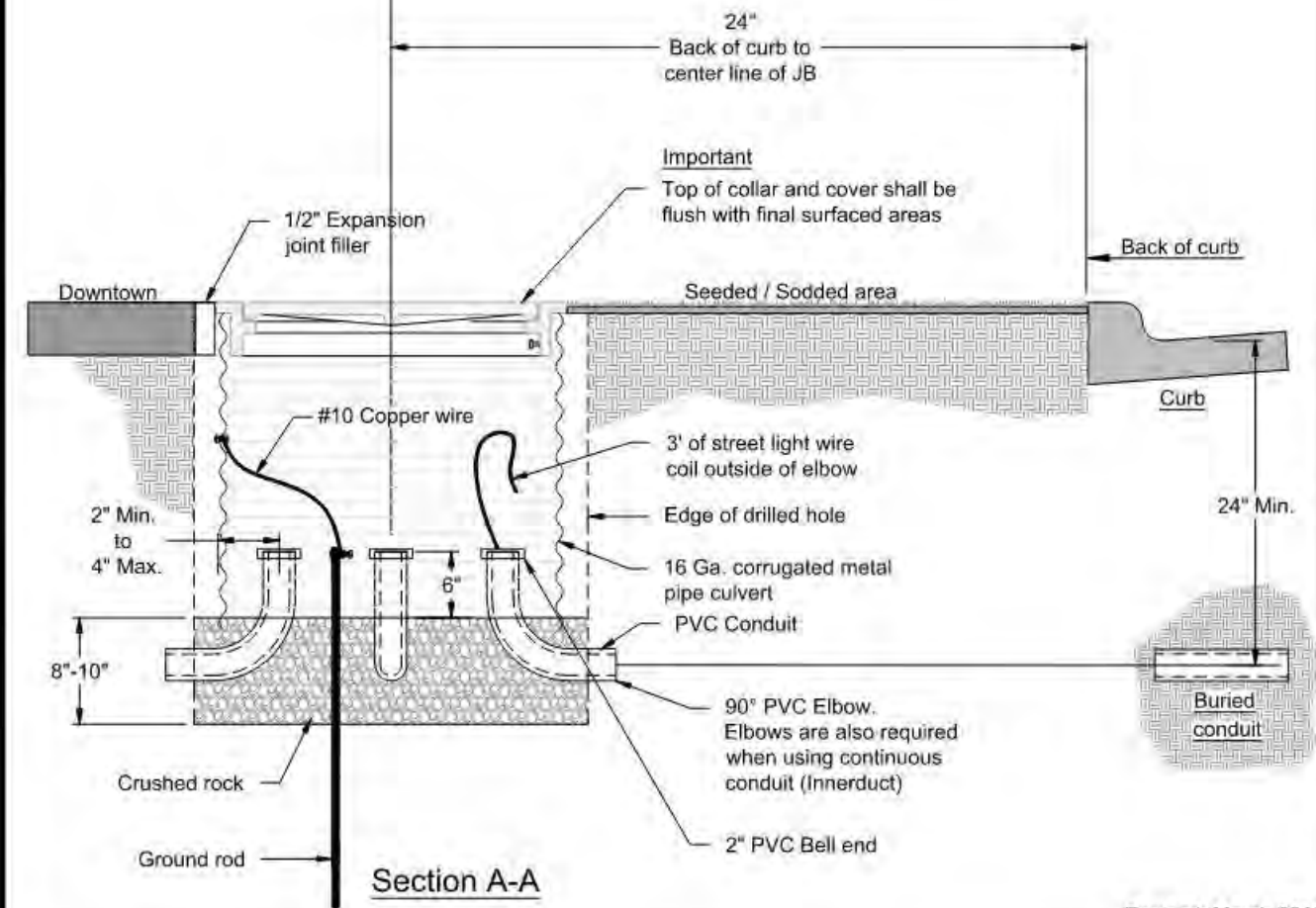
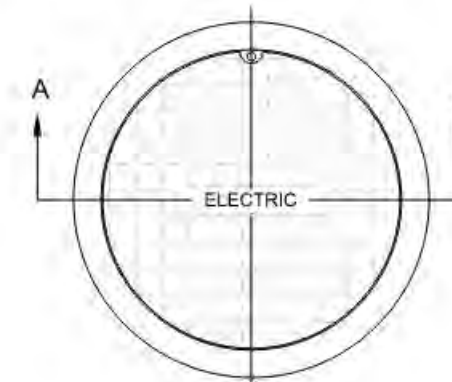
Number of conduit entrances varies with location of junction box.

Cover shall be stamped electric.

The junction box sizes and quantities are shown on plan sheets.

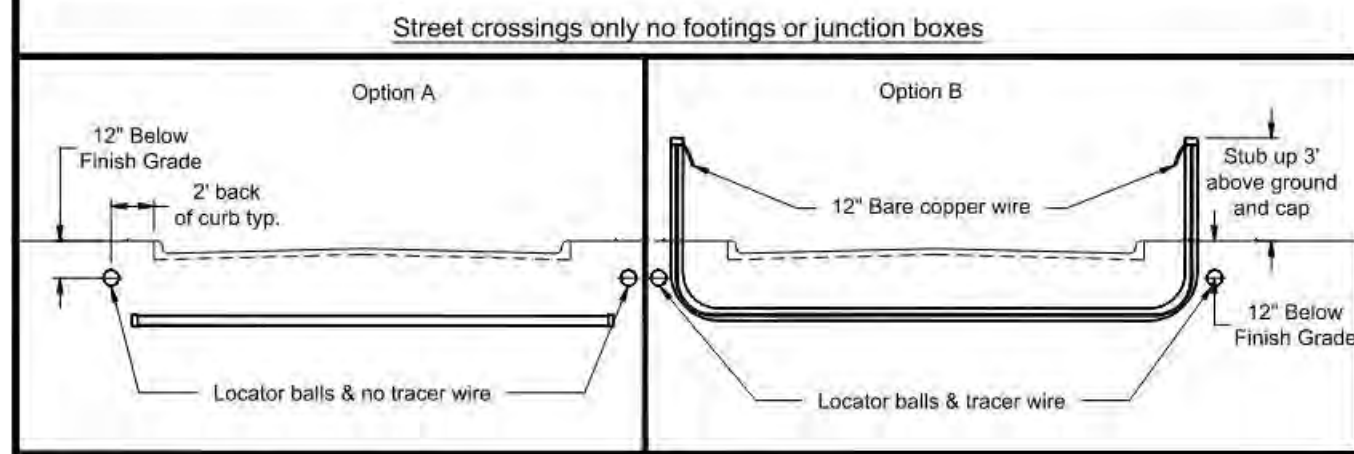
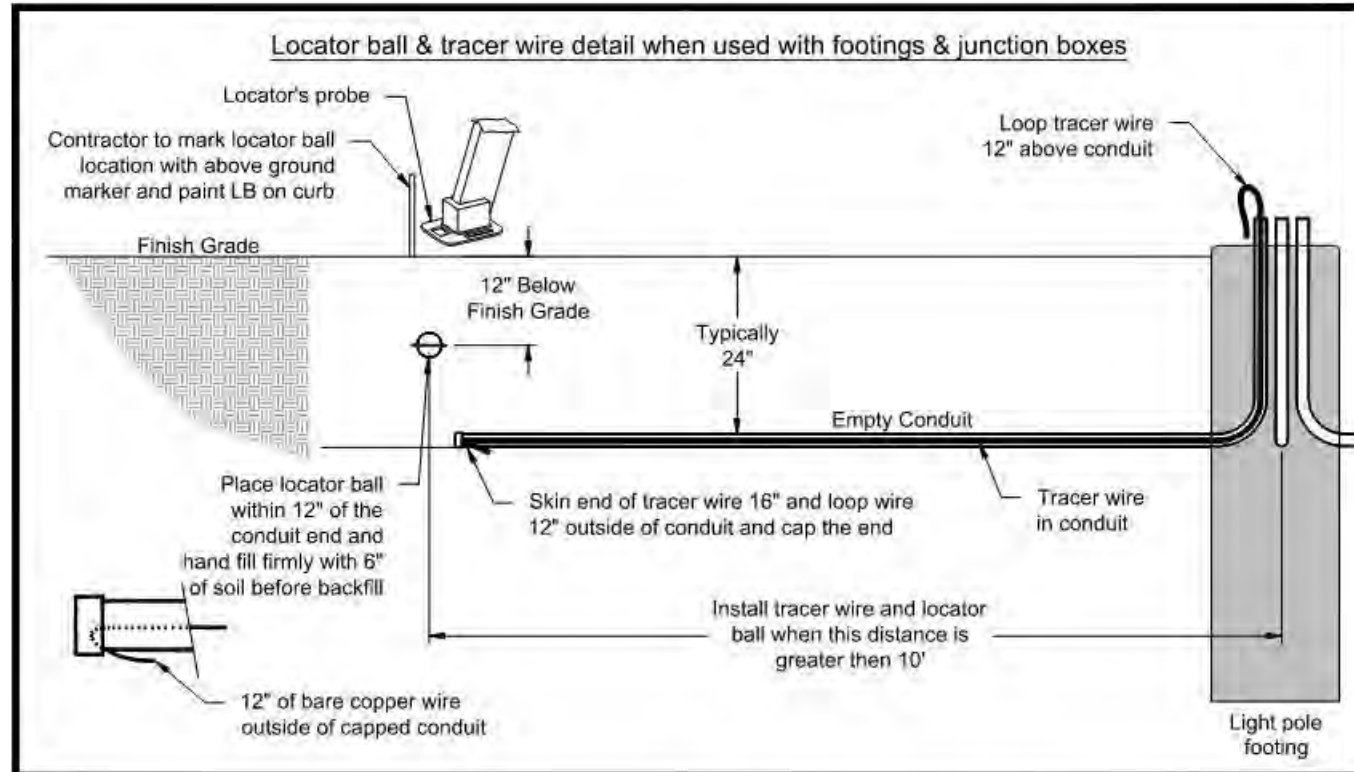
Electrical grounding and bonding contractor shall furnish and install ground rod, #10 stranded copper wire, ground rod clamp and appropriately size copper terminal lug bolted to the inside wall of the junction box.

Label all wires coming out of junction box regarding direction of wire with either tags or tape.



Revised: March 2018

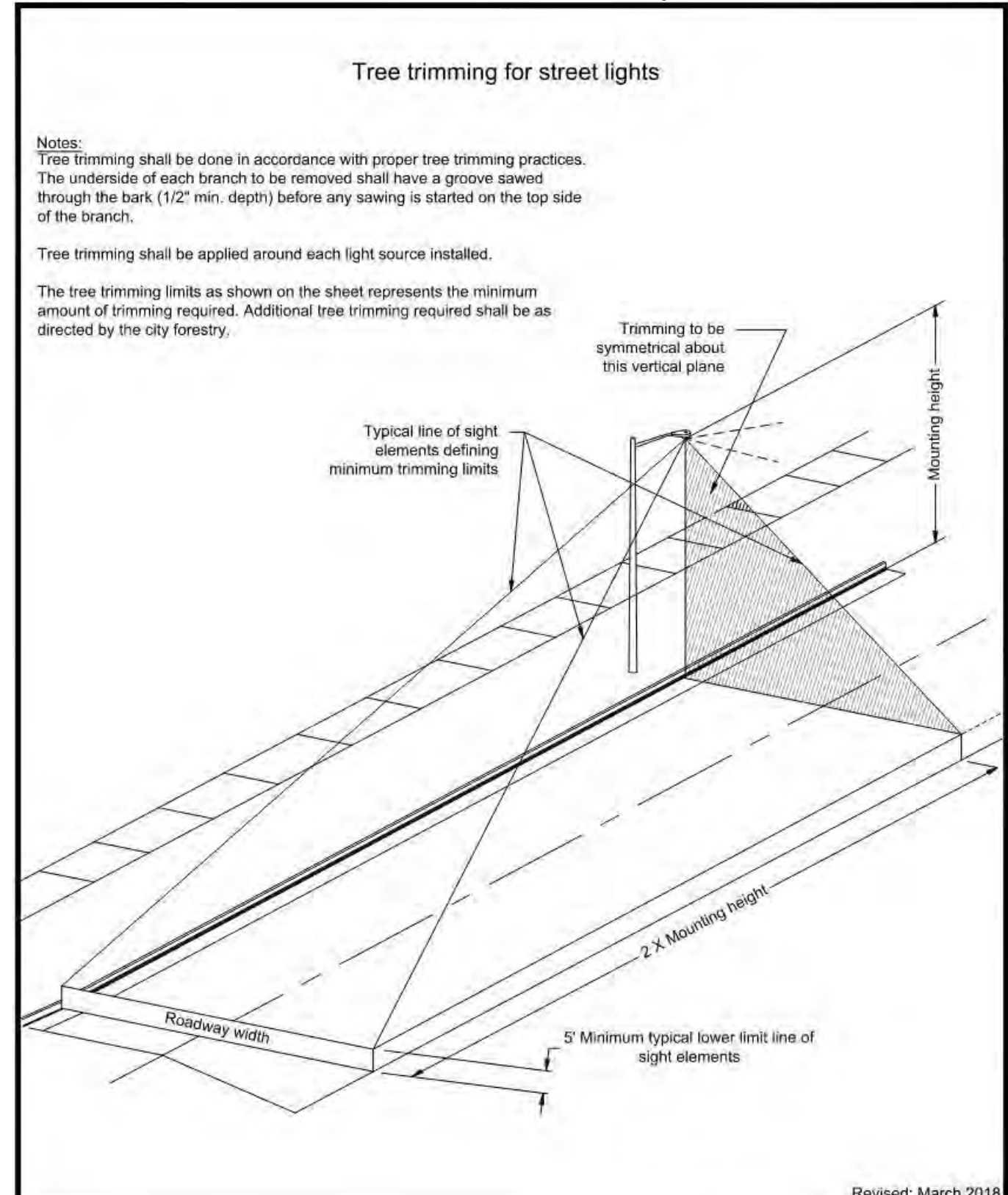
 <p>CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!</p>	<p>Junction Box - Lighting</p>	Specification Reference	Plate Number
		No. 635B	635.70



- Locator Ball Marker Notes:**
- Before placing the locator ball over the key point, decide if a tie-down procedure is necessary to keep it in place. If so, secure the ball by inserting a cable tie through one or both tie-down tabs and to the key point (E.G. pipe or cable).
 - If the key point is metallic, then the locator ball should be separated from it with a minimum of 4 inches of dirt.
 - Otherwise, put the locator ball over the desired point.
- Important: The locator ball cannot reliably reradiate the locator's signal at a separation greater than 5 ft. (1.5M). This is the maximum allowable distance between the locator ball and the locator. This implies that the ball marker should be buried at a distance less than 5 ft. to allow for the distance between the locator's probe and the ground surface.
- Hand fill at least six inches of soil over the locator ball.
 - Backfill the hole.

Revised: September 2020

<p>CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!</p>	<p>Locator Ball and Tracer Wire</p>	Specification Reference	Plate Number
		No. 635B	635.81



Revised: March 2018

<p>CITY OF SIOUX FALLS PUBLIC WORKS Providing a Better Quality of Life for You!</p>	<p>Tree Trimming for Street Lights</p>	Specification Reference	Plate Number
		No. 635B	635.84